

**Channel Islands National Marine Sanctuary (CINMS)  
Management Plan Revision**

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*A Socioeconomic Overview of the Santa Barbara and Ventura Counties as it Relates to Marine Related  
Industries and Activities*

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## **INTRODUCTION**

### **Background**

The CINMS is currently involved in a management plan revision, a process that is mandated to take place approximately every five years. Two major issues have emerged from public scoping meetings on the management plan revision; 1) Boundary Expansion and 2) Ecological or Marine Reserve(s) or “no take areas”. Changes with respect to either of these issues will entail management actions and regulations that may have socioeconomic impacts on current and future user groups.

For the management plan revision, the CINMS has organized a Sanctuary Advisory Council (SAC) made-up of various stakeholders. For the ecological or marine reserve (s), the CINMS has organized a Marine Reserve Working Group (MRWG), also made-up of various stakeholders, that will develop alternatives and make a recommendation to the SAC and the CINMS with regard to establishment of marine reserves. A science panel and socioeconomics team have been established to advise the CINMS, SAC and MRWG for both the boundary expansion and marine reserve (s).

The socioeconomics team has hired three contractors to assist in data collection for the recreation industry and the commercial fishing industry to support the socioeconomic impact analysis of the marine reserves (s). The Socioeconomics Team is led by two NOAA economists, Dr. Vernon R. (Bob) Leeworthy and Peter C. Wiley. For the recreation industry, Dr. Charles Kolstad, Professor of Economics at the University of California-Santa Barbara, is under contract to collect information. For the commercial fisheries, two contractors were hired to collect information; Dr. Craig Barilotti of Sea Foam Enterprises in San Diego, California and Dr. Caroline Pomeroy of the University of California-Santa Cruz. Dr. Barilotti is collecting information from all commercial fishermen that fish in the CINMS, other than squid fishermen, and Dr. Pomeroy is collecting information from squid fishermen that fish the CINMS.

The information being collected to support the socioeconomic impact analysis of the marine reserve (s) is being collected and compiled in a manner so as to capture both the temporal and spatial variation in activities for the recreation industry and catch and value for the commercial fisheries. The information will be placed in a geographical information system (GIS) using the ARCHVIEW software. The information from both the recreation industry and the commercial fishing industry is being collected using a one square nautical mile unit of resolution.

The information organized in the GIS will be linked with economic parameters from existing studies to develop estimates of economic impacts as measured by changes in both market economic values (e.g., sales/output, income and employment) and non market economic values (e.g., consumer’s surplus and economic rents). Socioeconomic profiles of those potentially impacted will be compared against all users from a given user group and against the general population of the local area (e.g., Santa Barbara and Ventura Counties).

To accomplish the above requires a review of the existing literature and data bases available and compiling this information in a manner that it can be used in the socioeconomic impact analyses. In some cases, available information will not support certain aspects of the proposed analyses. In addition, supplemental data collection and analysis may not be feasible with time and resources available. What we are left with is what is commonly referred to as the “best available information”.

Even though our focus here is on Santa Barbara and Ventura counties as the primary study areas for estimating economic impact, we have already learned that some impacts will be experienced in Los Angeles, Orange and San Diego counties. Impacts from kelp harvesting take place in San Diego County. A significant portion of the market squid catch is landed in San Pedro in Los Angeles County. And, we have also learned that several recreational fishing and diving operations operate out of Los Angeles, Orange and San Diego counties. So in our final analyses these impacts will have to be accounted for,

however, they will not be significant relative to the entire county economies for these three counties. They will be important for our purposes of estimating the impacts on users, both direct and indirect.

## **Purpose**

The purpose of this document is to provide the necessary background information on the local social and economic (socioeconomic) environment for which changes in management actions in the Channel Islands National Marine Sanctuary (CINMS) can be analyzed in a socioeconomic impact analysis. The information presented here is what we have found to date to be the “best available information”.

For the issues of boundary expansion and marine reserves, three direct uses would be potentially impacted; 1) tourist/recreational use, 2) commercial fishing (including kelp harvesting) and 3) offshore oil and gas. With respect to the local economies, each of these three uses will have ripple or multiplier effects as measured by market economic values (e.g., output/sales, income, employment and tax revenues). In this report, we attempt to review available information to assess how important these three industries are to the Santa Barbara and Ventura County economies. In addition, we present information on the currently known spatial distribution of recreational uses, commercial fishing and offshore oil and gas in the boundary expansion and marine reserve study areas. We will also present what is known about social and economic parameters that can be used in socioeconomic impact analyses for proposed management changes or regulatory changes in the two study areas.

Much of what is presented in the Demographic and Economic Profile section of this report is based on a report prepared by Environmental Defense entitled “An Economic Overview of Santa Barbara and Ventura Counties and Their Marine Resource-Based Industries: A preliminary descriptive report to aid socio-economic impact assessment of the proposed Channel Islands marine reserve network” (Kritzer, Foran and Fujita, 2000). This report was presented to the MRWG at their January 11, 2000 meeting. We double-checked the data and sources and in some cases updated the information from that report and present it here. Some of the information from that report was purposively left out either because we did not think it materially was useful or we have not as yet had the time to check the data and sources. Generally, however, we found the Environmental Defense report to be very helpful and has made a significant contribution to the socioeconomic team’s charge.

## **Demographic and Economic Profile**

**Population.** Historical population estimates presented here are from the U.S. Department of Commerce, Census Bureau (<http://www.census.gov>), while population projections are from the University of California-Santa Barbara, Economic Forecast Project. Ventura County has almost twice the population of Santa Barbara County and has been growing faster since 1980. Through the 1990s’, Ventura County population has been growing faster than both the State of California and Santa Barbara County. Santa Barbara County has been growing slightly slower than the State of California. Santa Barbara County is projected to grow faster between 1998-2002 than Ventura County (7.8% vs. 6.0%), but then slower between 2002-2006 (3.1% vs. 5.8%). See Table 1.

Although, Ventura County’s population is larger and has been growing faster than Santa Barbara’s, the relative compositions of both populations are quite similar in terms of gender, race/ethnicity and age and, both counties are projected to change in the same general directions. For the 1990s’, there appear to be no significant differences with regard to gender or race/ethnicity between Santa Barbara and Ventura Counties. However, there does appear to be a difference in age distributions. Santa Barbara appears to be a little older with a higher percent of population age 65 or older indicating a larger retirement community. For the projection periods, the most significant change expected is the proportion of population that will be Latino. The populations of both counties are expected to become more Latino and less White, Not Latino, while the Black, Not Latino and Asian, Not Latino remain at approximately constant proportions. The projected proportions of retirement age populations are expected to remain constant in Santa Barbara County, while increasing slightly in Ventura County. See Table 2.

Table 1. Population, Population Growth and Projected Growth for California, Santa Barbara and Ventura Counties

	California	Santa Barbara County	Ventura County
Population			
1990	29,950,100	370,900	671,600
1994	31,317,200	386,700	703,700
1998	32,682,800	389,500	732,100
Population Growth (%)			
1980-1990	25.7	23.7	26.4
1990-1994	4.6	4.3	4.8
1994-1998	4.4	0.7	4.0
1990-1999	11.2	5.8	11.4
Population Projections			
2002	n/a	419,800	776,000
2006	n/a	433,000	821,200
Population Projection Growth			
1998-2002	n/a	7.8	6.0
2002-2006	n/a	3.1	5.8

Sources: Population; U.S. Department of Commerce, Census Bureau (<http://www.census.gov>). Population Projections; University of California-Santa Barbara, Economic Forecast Project, 1999 Economic Outlook Santa Barbara and Ventura Counties.

Table 2. Demographic Profiles of Santa Barbara and Ventura County Populations

<b>Santa Barbara County</b>					
	1990	1994	1998	2002	2006
<b>Gender</b>					
Male	50.2	51.2	50.5	50.6	50.6
Female	49.8	48.8	49.5	49.4	49.4
<b>Ethnicity</b>					
White	66.2	63.7	63.1	62.1	60.7
Black	2.5	2.5	2.7	2.8	2.9
Asian	4.7	4.6	4.7	4.7	4.8
Latino	26.6	27.6	29.5	30.4	31.4
<b>Age</b>					
Less than 5	7.5	7.8	7.5	6.9	6.9
5 to 19	20.2	19.4	20.0	20.6	20.4
20 to 34	28.6	26.8	24.1	21.2	18.9
35 to 44	14.4	15.7	16.3	17.0	17.3
45 to 54	9.2	10.4	12.0	13.4	14.4
55 to 64	7.8	7.5	7.7	8.5	9.7
65 to 74	6.9	6.8	6.4	6.1	6.1
75 and Over	5.4	5.6	6.0	6.2	6.2
<b>Ventura County</b>					
<b>Gender</b>					
Male	50.4	50.5	50.5	50.6	50.6
Female	49.6	49.5	49.5	49.4	49.4
<b>Ethnicity</b>					
White	66.0	64.4	62.7	61.1	59.4
Black	2.2	2.2	2.1	2.3	2.3
Asian	5.4	5.4	5.5	5.6	5.9
Latino	26.4	28.0	29.7	31.0	32.4
<b>Age</b>					
Less than 5	8.3	8.3	7.9	7.4	7.4
5 to 19	22.4	22.1	22.2	22.1	21.4
20 to 34	25.7	23.2	21.2	20.2	19.8
35 to 44	16.3	16.7	16.3	15.3	13.9
45 to 54	10.6	12.3	13.6	14.4	14.6
55 to 64	7.3	7.7	8.6	10.0	11.3
65 to 74	5.5	5.7	5.8	6.2	6.9
75 and Over	3.8	4.1	4.3	4.5	4.7

Source: University of California – Santa Barbara, Economic Forecast Project, 1999 Economic Outlook Santa Barbara and Ventura Counties.

**Labor Force.** As with population, the labor force of Ventura County is almost twice that of Santa Barbara County. Unlike population, however, the labor force of both counties have followed different growth patterns than that of the State of California. In the early 1990s', both counties labor forces grew faster than that of the State of California. However, from 1994-1998, labor force growth came to almost a halt in both counties, actually declining in Santa Barbara. As with population, Ventura County's labor force grew faster than Santa Barbara County's from 1990 to 1998 (6.8% vs. 3.7%). Labor forces in both counties are projected to grow relatively fast between 1998-2002, but, as with population, both are expected to slow over the 2002-2006 period, more in line with projected population growths. Labor Force composition was not available on a time series basis, nor were there projections available. However, comparing 1990 labor forces in both counties, there were no significant differences between the counties and the patterns generally matched those of populations for the two counties. Although, as we shall discuss below, there is a difference between those that work in a county and those that live in a county. And, this will have important implications for assessing socioeconomic impacts.

Table 3. Labor Force, Labor Force Growth and Projected Labor Growth for California, Santa Barbara and Ventura Counties

	California	Santa Barbara	Ventura
<b>Labor Force</b>			
1990	15,193,400	193,000	370,400
1994	15,450,000	196,900	385,300
1998	16,323,900	195,700	387,700
<b>Labor Force Growth (%)</b>			
1990-1994	1.7	2.0	4.0
1994-1998	5.7	-0.6	0.6
1990-1999	9.2	3.7	6.8
<b>Labor Force Projections</b>			
2002	n/a	208,900	412,900
2006	n/a	216,100	436,800
<b>Labor Force Projection Growth</b>			
1998-2002	n/a	6.7	6.5
2002-2006	n/a	3.4	5.8
<b>Labor Force 1990</b>			
<b>Gender</b>			
Male	56.0	55.4	56.7
Female	44.0	44.6	43.3
<b>Ethnicity</b>			
White	60.3	67.8	68.2
Black	6.2	2.2	2.1
Hispanic	23.6	25.2	24.3
Native American	0.6	0.8	0.5
Asian/Pacific Islander	9.0	3.9	4.9
Other	0.1	0.1	0.1

**Employment and Income.** In conducting economic impact analyses, an important first step is defining the study area. In developing regional economic impact models it is important to understand the interrelationships between surrounding areas. The county political unit and metropolitan statistical areas (MSAs) are used to organize statistical information about employment and income. MSAs attempt to define areas that cross political boundaries but are economically closely linked because of numerous interrelationships. There is no Santa Barbara-Ventura County MSA indicating that these two counties are not highly linked economically. The only MSA in the two-county area exists within Santa Barbara County, e.g., Santa Barbara-Lompoc-Santa Maria MSA. Therefore, we only report Santa Barbara County and Ventura County information here.

Income is reported from two perspectives; 1) income by place of residence and 2) income by place of work. Income and employment by place of work are further reported by industry. Income and employment by place of work is also reported for wage and salary workers versus proprietors (business owners). Differences in these measurements often reveal important differences about the nature of the local economies that are important for socioeconomic impact analyses. For example, a large difference between income by place of residence and income by place of work might reveal that the economy of the area under study is largely driven by income earned from sources unrelated to work in the area and this will dampen the impacts of management changes that impact local work related income and employment. A large number of proprietors indicate the prevalence of small businesses which receive special treatment under Federal Regulatory Impact Reviews.

*Income by Place of Residence versus Income by Place of Work.* In 1990, Santa Barbara County's income by place of work was only 48.8% of the income by place of residence. This was much higher than the 36.2% for the State of California, but much lower than the 76.0% for Ventura County. From 1990 to 1997, the proportion of income by place of work rose for Santa Barbara County (from 48.8% to 59.6%), but declined for Ventura County (from 76.0% to 72.1%). Santa Barbara County is driven much more by forces unrelated to work in the county than Ventura County.

Table 4. Personal Income by Place of Residence and by Place of Work  
For California, Santa Barbara and Ventura Counties

	Income by Place of Residence (000's \$)	Income by Place of Work (000's \$)	Work as % of Residence
1990			
California	639,297,540	469,355,580	36.2
Santa Barbara	8,282,659	5,567,203	48.8
Ventura	14,744,992	8,378,763	76.0
1994			
California	718,321,442	517,993,813	38.7
Santa Barbara	9,311,405	5,887,111	58.2
Ventura	16,557,595	9,799,145	69.0
1997			
California	846,838,798	607,976,152	39.3
Santa Barbara	10,760,412	6,743,656	59.6
Ventura	19,173,001	11,138,553	72.1

There are several sources of income unrelated to work in a county that are recorded and they are generally referred to as transfer payments and property income. Social security and pensions are two of the most important transfer payments and dividends, interest and rent are the most important sources of property income. Social Security and Medicare deductions from current workers are recorded as a deduction in income by place of work in deriving income by place of residence. The other difference between income by place of work and residence is called the residence adjustment. The residence adjustment is the net flow of income to a county that results from some residents that work outside the county of residence and bring income into the county (inflow of income) versus residents from other counties that work inside the county but take their incomes home to their counties of residence (outflow of income).

In 1990, Santa Barbara had a net outflow of income or a residence adjustment of about -\$131 million. By 1997 this figure had grown to almost -\$150 million. Ventura County, however, has a net inflow of income based on the residence adjustment. In 1990, the Ventura County residence adjustment was about \$2.95 billion and by 1997 rose to over \$3 billion.

The Census of Intercounty Commuters for 1990 reveals the nature of the above net flows (see Appendix Table A.1). The 1990 Census of Intercounty Commuters shows that Santa Barbara County had a net inflow of workers into the county of 4,397. There were 10,236 residents of Santa Barbara County that commuted to work outside the county and there were 14,633 non residents that worked inside the county. This net flow of workers into the county results in a net outflow of income from the county as non resident workers take their earned incomes home to their counties of residence.

In 1990, Ventura County had a net outflow of workers of -55,392. There were 84,838 residents that commuted to work outside the county and 29,446 non residents that worked inside the county. The net outflow of workers resulted in a net inflow of income as residents that worked outside the county brought their incomes home to Ventura County. Los Angeles County accounted for the overwhelming majority of residents that commute to work outside the county (92.5%). Los Angeles and Ventura counties are highly connected with 23,635 of the 26,354 (or 89.7%) non residents that work inside Ventura County coming from Los Angeles County.

Ventura County and Santa Barbara County are not highly connected. Relatively small proportions of both counties work forces live in the neighboring county. In 1990, only 2,433 residents of Santa Barbara County commuted to work in Ventura County and only 5,594 Ventura County residents commuted to work to Santa Barbara County. Ventura County residents only made up only about 3% of all Santa Barbara County workers and Santa Barbara County residents made up less than one percent (0.8%) of all Ventura County workers.

*Proprietors.* Proprietors account for a significant proportion of both income and employment in both Santa Barbara and Ventura counties. In 1990, proprietors accounted for 18.7% of income and 20.2% of employment in Santa Barbara County and 15.65% of income and 19.9% of employment in Ventura County. In the 1990s, the relative importance of proprietors in both counties increased. In 1997, proprietors accounted for 19.1% of the income and 22.3% of the employment in Santa Barbara County and 16.8% of the income and 23.1% of the employment in Ventura County. These proportions were relatively higher than that for the entire State of California. This is a fairly good indicator that small businesses are very important in both counties. See Table 5.

Table 5. Proprietors Income and Employment for California, Santa Barbara and Ventura Counties

	Proprietors Income (000's \$)	%	Proprietors Employment	%
1990				
California	60,048,930	12.8	2,908,845	17.2
Santa Barbara	1,041,631	18.7	43,583	20.2
Ventura	1,307,970	15.6	65,577	19.9
1994				
California	73,643,501	14.2	3,287,440	19.6
Santa Barbara	1,100,644	18.7	47,273	21.7
Ventura	1,668,389	17.0	77,455	22.2
1997				
California	86,155,451	14.2	3,608,489	20.0
Santa Barbara	1,289,111	19.1	51,809	22.3
Ventura	1,870,996	16.8	83,690	23.1

*Indicators of Economic Health and Wealth.* Unemployment rates and per capita incomes are probably the two most popular measures used as indicators of the health and wealth of communities, states or nations. Through the 1990s both unemployment and real per capita income (per capita income in 1999 \$ i.e., adjusted for inflation using the Consumer Price Index) moved in the same directions in both Santa Barbara and Ventura counties. Throughout the 1990s unemployment rates in Santa Barbara and Ventura counties were lower than that for the entire State of California. Santa Barbara's unemployment rate has always been below that of Ventura County and, except for 1994, Santa Barbara's unemployment rate was lower than that for the entire U.S. Ventura County's unemployment rate has remained somewhere between that for the entire State of California and the U.S.

Real per capita incomes in Santa Barbara and Ventura counties were higher than that for the entire State of California and for the U.S throughout the 1990s. Santa Barbara's real per capita income is slightly higher than Ventura County's and has grown faster than Ventura County's. In 1990, real per capita income was 1.6% higher in Santa Barbara County than in Ventura County, by 1998 Santa Barbara County's real per capita income was 3.5% higher than Ventura County's. This is largely explained by a higher proportion of Santa Barbara County's income coming from dividends and interests from investments. The 1990s were a relatively good time for return on investments in stocks.

Other comparisons between the two counties reveal another source of the difference in real per capita incomes between the two counties. Average Earnings Per Job and Average Wage & Salaries reveal that real average earnings per job and real average wages & salaries declined in Santa Barbara County from 1990 to 1997, while in Ventura County there was a more mixed result. From 1990-1997, real average earnings per job decreased, while real average wage & salaries increased. In addition, real average nonfarm proprietor's income increased in Ventura County, while declining in Santa Barbara County (see Appendix Table A.2). Again we see from these patterns that Santa Barbara County incomes are much more dependent on sources not related to work in the county than in Ventura County.

Table 6. Unemployment Rates and Per Capita Incomes for U.S., California, Santa Barbara And Ventura Counties

	U.S.	California	Santa Barbara County	Ventura County
<b>Unemployment (%)</b>				
1990	5.6	5.8	4.9	5.7
1994	5.6	8.6	7.2	7.8
1998	4.5	5.9	4.4	5.6
1999	4.2	5.2	3.9	4.8
<b>Per Capita Income (\$)</b>				
1990	19,156	21,363	22,361	22,002
1994	22,056	22,953	24,406	23,690
1997	25,288	26,314	27,839	26,563
1998	26,482	27,579	28,678	27,699
<b>Per Capita Income (1999 \$)</b>				
1990	24,328	27,131	28,398	27,943
1994	24,703	25,707	27,335	26,533
1997	26,300	27,367	28,953	27,626
1998	27,012	28,131	29,252	28,253

For Santa Barbara County, the disparity between the trends in real per capita income and measures of income from work in the county reveal a pattern often cited about the distribution of income and wealth becoming more concentrated amongst higher income groups. Neither workers or proprietors in Santa Barbara shared the gains in income and wealth indicated by the increase in real per capita income through the 1990s. Workers and proprietors have fared relatively better in Ventura County. On average, workers now earn more in Ventura County than in Santa Barbara County. Although, the trend for the average real earning of proprietors is on the decline in Santa Barbara County and increasing in Ventura County, Ventura County proprietors still earn, on average, significantly less than Santa Barbara County proprietors.

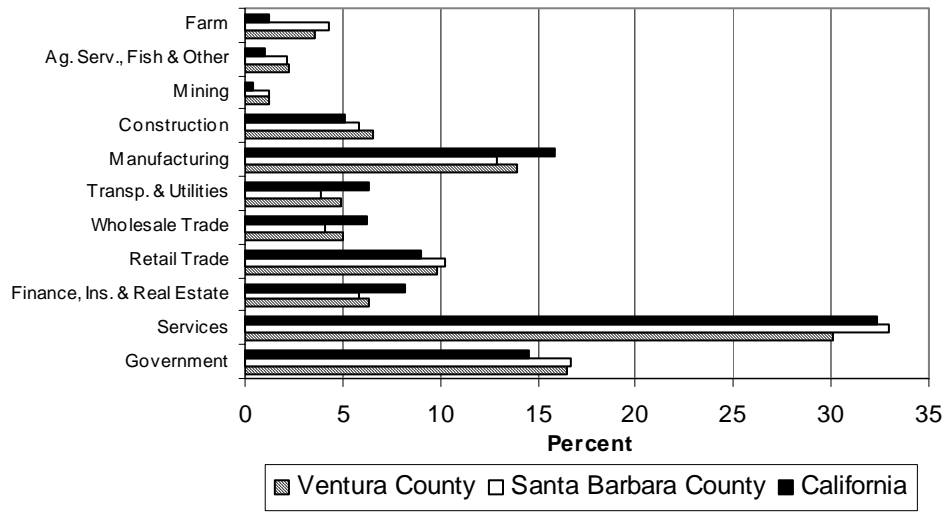
*Income and Employment by Industry.* For purposes of economic impact analyses, in terms of income and employment impacts, income and employment by industry is critical because it provides the necessary control totals in the economic accounting system. A limitation of this accounting system is that it is still based on the old industrial economy and generally is not designed to yield direct insights into how the use of natural resources and the environment are connected to the economy. Linking the economy and the environment is the very heart of the Socioeconomic Team's task. We need to be able to answer the question, if the use of the natural resources of the CINMS is changed, what will be the impact on the income and employment in the local economies? To answer this question requires supplemental information organized so that it maps directly into the current system of accounting. In some cases, the income and employment by industry statistics can give us upper bound estimates of the direct portion of impact (i.e., not counting multiplier impacts) for particular uses. Our approach here is to first look at the most aggregated information, then proceed to evaluate information collected by other institutions and how it maps into the more aggregated statistics. Each step along the way our objective is to see how close we can get to linking the economy with the environment and assessing the relative importance to the economy of natural resource base uses.

Figures 1 and 2 show the percentages of income and employment by industry to Santa Barbara and Ventura counties (see Appendix Tables A.3 and A.4 for more details and comparisons for different years). At this very aggregated level, the distributions for both income and employment by industry are very similar for the two counties. Commercial fisheries would be included under the category “Agricultural Services, Forestry, Fishing and Other”. In 1997, this category accounted for only 2.2% of income by place of work in Santa Barbara County and only 2.3% in Ventura County. This serves as a first step upper bound on the proportion of income by place of work for the direct impacts of the harvesting portion (not including multiplier impacts) of commercial fishing. Other direct impacts of commercial fishing would include some portion of Wholesale Trade (e.g., fish houses and buyers) and some portion of Manufacturing (fish processing).

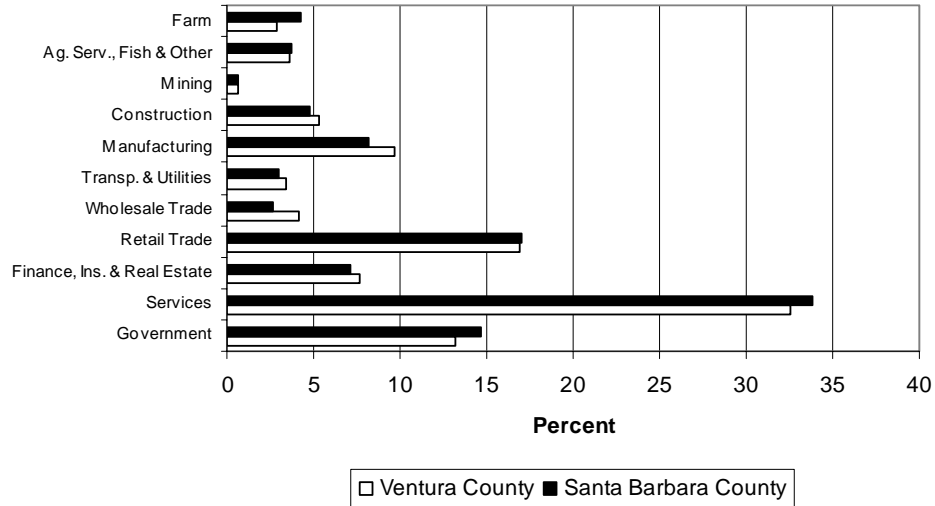
The category “Mining” includes oil and gas extraction and production activities. In 1997, this category accounted for only 1.2% of income by place of work in both Santa Barbara and Ventura counties. This estimate serves as a first step upper bound on the proportion of income by place of work for the direct impacts of the extraction and production portion of offshore oil and gas activities. Other direct impacts of oil and gas extraction and production activities would include some portion of Construction and some portion of Transportation, Communication and Public Utilities (e.g., pipelines, tankers, port and towing).

The Retail Trade and Services sectors are where the direct impacts of tourism/recreation would be included. However, these categories are too broad to yield any useful bounds for estimation of the direct impacts for tourism/recreation. The accounts, as stated above, were simply not designed for this purpose. In any case, the first step of linking the three natural resource use activities to the economy yielded only limited insights.

**Figure 1. Personal Income Percentage by Industry for California and Santa Barbara & Ventura Counties. 1997**



**Figure 2. Employment Percent by Industry for Santa Barbara and Ventura Counties, 1997**



*Income and Employment: Step 2 Additional Disaggregation.* The accounts reviewed above are what are called two-digit SIC (Standard Industrial Classification) level of aggregations. The SIC system of accounting can actually go down to four and six digit levels, which contain more specificity about the activity. However, because of nondisclosure rules to protect the privacy of business information, the four digit level is the best available for large counties and even here there are many categories for which information is not reported due to nondisclosure. In this step, we will explore how much detail we can glean about the three sectors that are our primary interest. Only income is reported at the lower levels of disaggregation.

*Commercial Fishing Industry.* In 1997, fishing income was a little over \$4.8 million in Santa Barbara County and over \$5.9 million in Ventura County. This represents less than one percent of the incomes by place of work in both counties (0.07% in Santa Barbara and 0.05% in Ventura). Again, this would be the income received by harvesters or commercial fishermen including crews and proprietors of the harvesting operations. It would not include buyers and fish houses or processors of commercial fish products.

Table 7. Direct Income to Commercial Fishing Harvesting Sector: Santa Barbara And Ventura Counties 1991 – 1997

Year	Santa Barbara County (000s \$)	Ventura County (000s \$)	Santa Barbara County (000s 1999 \$)	Ventura County (000s 1999 \$)
1991	3,520	3,010	4,306	3,682
1992	2,912	3,105	3,458	3,687
1993	2,618	3,644	3,018	4,201
1994	3,384	3,895	3,804	4,379
1995	5,194	6,618	5,678	7,235
1996	4,708	5,731	4,999	6,085
1997	4,811	5,937	4,994	6,163

Sources: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (<http://www.bea.doc.gov>) and University of Virginia Library (<http://fisher.lib.virginia.edu>).

*Offshore Oil and Gas.* In 1997, income from oil & gas extraction was over \$71.2 million in Santa Barbara County and over \$118.2 million in Ventura County. For both counties, these amounts accounted for 1.06% of the income by place of work. Again, these amounts do not include oil & gas related direct impacts from such activities as construction, manufacturing, transportation and engineering and management services. For these later related sectors the four digit level is not descriptive enough to tie them to oil and gas and, when descriptions were available to suggest a direct link (e.g., pipelines, except natural gas), the numbers were non disclosed due to a small number of firms.

*Tourism/Recreation.* Tourism/recreation has been a notoriously difficult activity to document because the expenditures made while undertaking the activities are spread across so many sectors. Few really capture the industry. Three commonly used are “Eating and Drinking Places” (within Retail Trade), “Hotels and Other Lodging Places”, and “Amusement and Recreation Services” (within Services). A fourth is sometimes included “Museums, Botanical and Zoological Gardens” (within Services). Molotch and Freudenburg (1996) and Paulsen, Molotch and Freudenburg (1996) use the first three as indicators of tourism/recreation in their reports to the U.S. Department of the Interior’s, Minerals Management Service on the historical role that oil and gas played in the development of Santa Barbara and Ventura Counties. It

is also commonly used by the United Nations Environmental Programme when profiling third world countries for economic development programs. Unfortunately, these three sectors tell us very little about tourism/recreation. They are not good discriminators across areas in a single point in time, nor are they good indicators of the trends of tourism/recreation over time in a given place. Life style changes have resulted in high proportions of the local population eating out. Business related travel is a major portion of hotel and motel business and some communities may have extensive numbers of hotel and motels with very little in the way of tourism/recreation. In highly diverse economies like the U.S., measurements from these three industries yield nothing of use to get us close to linking natural resource uses with the economy. We must look elsewhere for supplemental information to get us closer to our goal.

*Income and Employment: Step 3- Supplemental Information.* In step 2, we were able to narrow in on commercial fishing and oil and gas contributions to the local economies at the first stage of direct impacts. The industry accounts did not support any additional insights for tourism/recreation. In this step, we sought out additional sources of information and to see what they might reveal about the activities and their income and employment impacts.

*Commercial fishing Industry.* For the commercial fisheries, we first went to information compiled by the Pacific Fisheries Management Council (PFMC). The PFMC maintains a data base called PacFin which reports commercial fish landings by port, county and species. The PFMC also has developed a regional economic impact model to translate ex vessel value (i.e., the dollar amounts received by harvesters for their catch) to total income generated within the county where landed. **This amount includes full multiplier impacts.**

In 1997, total ex vessel value of landings in Santa Barbara County was \$8.852 million and \$21.659 million in Ventura County (see Appendix Tables A.5 and A.6). As a check, we compared the income estimates from step 2 above as a percent of total ex vessel value in each county. For Santa Barbara County, income to harvesters was 54.35% of ex vessel value and for Ventura County income to harvesters was 27.41% of ex vessel value. These estimates are certainly within the range of estimates from various cost and earnings studies in the fisheries. The difference between the two counties may be explained by the large proportion that market squid comprises of ex vessel value in Ventura County. We might hypothesize a high capital to labor ratio in the market squid fishery resulting in a lower ex vessel value to income ratio for Ventura County.

The 1997 ex vessel values of landings in the two counties generated \$19.458 million in total income in Santa Barbara County and \$77.925 million in Ventura County. The implied average income multipliers (ratio of total income generated to ex vessel value) were 2.2 for Santa Barbara County and 3.6 for Ventura County. So even though Ventura County had an initially low income-to-ex vessel value ratio for harvesters compared with Santa Barbara County, Ventura County landings had higher total multiplier impacts. Of interest is that the highest multipliers for both Santa Barbara and Ventura counties were those for market squid (5.0 for Santa Barbara County and 4.5 for Ventura County). This would indicate more processing associated with market squid or local retention for retail and restaurant markets. The California Seafood Council lists five businesses in Ventura County that are involved in either wholesaling or processing market squid.

In 1997, the commercial fishing industry is estimated to be less than one percent of the incomes by place of work in both counties (0.29% in Santa Barbara County and 0.70% in Ventura County). If we calculate commercial fishing industry generated income as a percent of total income by place of residence, it is of course even a much smaller proportion (0.18% in Santa Barbara County and 0.41% in Ventura County). Thus, it is fair to conclude that any impacts from changes in management actions or regulations of the commercial fishing industry in these two counties will not be noticed in the economic accounts. This does not mean that impacts to the commercial fisheries is not important, it is very important to those that are impacted and, therefore should be important to those in charge of managing the natural resources of the area. The conclusion is limited to managers, planners and policy makers that would worry about significant impacts on the local economies and related fiscal implications to government programs and services.

*Offshore Oil and Gas.* For Oil & Gas, income information was not available for further disaggregation. Instead, the University of California-Santa Barbara Economic Forecast Project (UCSB-EFP) develops estimates for both Santa Barbara and Ventura Counties based on the SIC Category Mining. It is often mislabeled in their reports as Oil & Gas or Natural Resource Extraction when it includes all mining activities. The numbers are a bit confusing because UCSB-EFP reports wage & salary employment by industry, excluding proprietors by industry. The U.S. Department of Commerce, Bureau of Economic Analysis (BEA) is the main source of the information on income and employment by industry and county that we have presented so far. BEA reports that in 1997 there were 1,421 wage & salary workers and proprietors in the Mining sector of Santa Barbara County versus 1,033 wage & salary employees reported by UCSB-EFP. The implication is that there were 388 proprietors in Santa Barbara County involved directly in mining activities in Santa Barbara County in 1997. In 1997, the wage & salary employment for the Mining sector was 0.57% of total wage & salary employment in Santa Barbara County and proprietors in the Mining Sector were 0.75% of the total number of proprietors in Santa Barbara County. These numbers appear to be reasonable and suggest that these numbers refer to the total Mining sector not just Oil & Gas. See Table 8 for a summary of the 1997 employment for the Mining sector for both counties.

Table 8. Mining and Oil & Gas Employment in Santa Barbara and Ventura Counties, 1997

County	UCSB Wage & Salary	%	USBEA Wage & Salary	%	USBEA Proprietors	%	Total Wage & Salary	Total Proprietors
Santa Barbara	1,033	0.57	1,421	0.61	388	0.75	180,542	51,809
Ventura	1,650	0.59	2,121	0.58	471	0.56	279,307	83,690

Sources: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (<http://www.bea.doc.gov>) and UCSB, Economic Forecast Project, 1999 Economic Outlook for Santa Barbara and Ventura Counties.

Another source that hits more directly on what we want to measure is the California Offshore Oil and Gas Energy Resources Study referred to as the COOGER Study funded by the U.S. Department of the Interior, Minerals Management Service, Pacific OCS Region. This study estimates the employment from all activities directly associated with offshore oil and gas related activities in each county. There are two important features of this distinction. First, the employment estimates attempt to include all direct impacts in each county. Direct impacts include not only the employment in the Oil and Gas sector directly related to offshore oil & gas extraction and production, but includes the related activities such as construction, pipelines, tankers and loading and offloading facilities, trucking transportation and engineering and management services. Even though all the direct impacts are accounted for in this approach, the multiplier impacts are not included.

The second important distinction was the derivation of employment impacts by county. Many of the offshore oil and gas platforms are located off the coast of Santa Barbara County, however, a large portion of the employment impacts from these operations take place in Ventura County.

The COOGER Study used 1997 as a baseline and forecasted employment impacts under various scenarios of offshore oil and gas development. For 1997, Santa Barbara was estimated to have had an estimated 364 employees directly employed in offshore oil and gas related activities, while Ventura County had 577 employees. For both counties, offshore oil and gas employment was only a fraction of one percent (0.16%) of total county employment.

The COOGER Study forecasted employment on numerous development scenarios and developed estimates for years 2000, 2005, 2010 and 2015. For purposes of presentation, we chose to only report estimates from the scenarios with the lowest and highest employment estimates. The results are summarized in Table 9. Even in the highest offshore oil and gas development scenarios, oil and gas employment is projected to decline in both counties.

Table 9. Offshore Oil & Gas Related Employment for Santa Barbara and Ventura Counties - COOGER Report

County/Scenario	1997	2000	2005	2010	2015
Santa Barbara					
Low	364	370	347	215	109
High	364	370	378	468	415
Ventura					
Low	577	536	426	206	188
High	577	528	566	410	291

Oil & Gas Related Employment as Percent of Total Employment

County/Scenario	1997	2000	2005
Santa Barbara			
Low	0.17	0.16	0.14
High	0.17	0.16	0.15
Ventura			
Low	0.17	0.14	0.10
High	0.17	0.14	0.14

Source: California Offshore Oil and Gas Energy Resources Study (COOGER), U.S. Department of the Interior, Minerals Management Service, Pacific OCS Region.

It is fairly safe to conclude that any impacts from management actions and regulations that adversely impact offshore oil and gas activities will not show up in the economic accounts of either Santa Barbara or Ventura counties as being significant. Even with large multiplier impacts, oil and gas impacts would be less than one percent of the local economies. However, in Santa Barbara County there is another view that suggests that fiscal impacts on local government financing might be more significant in terms of the total industry.

The COOGER Study reports that in fiscal year 1998-99 oil and gas was responsible for generating 4.7% of Santa Barbara County's property taxes. About 88% of the property taxes from offshore oil and gas are related to two facilities located on the south coast of Santa Barbara County (Las Flores Canyon and the Gaviota Oil and Gas Facility). For Ventura County, property taxes from offshore oil and gas facilities are no longer significant. The COOGER Study reports that, for Ventura County, the 1998 fiscal year property taxes from oil and gas amounted to only 0.1% of total Ventura County property taxes.

*Tourism/Recreation.* The supplemental information we have been able to assemble to date is not well documented and is inconsistent across sources. In some cases, the inconsistencies may simply be a matter of definitions (e.g., only measuring direct impacts versus full impacts, including multiplier impacts). Below we present the information and our preliminary assessment of the range of relative importance of tourism/recreation to the Santa Barbara and Ventura County economies. Marine recreation uses in either or

both the CINMS and Boundary Expansion Study Area for the CINMS would be some sub-set of these estimates.

There are three basic sources of information on tourism/recreation for Santa Barbara and Ventura counties. There is more information available for Santa Barbara County than for Ventura County. Santa Barbara County has a Conference & Visitors Bureau and Film Commission which does their own survey of visitors and estimates the number of visitors annually and their total expenditures in the county. The UCSB-EFP summarizes this information and forecasts these measures (Table 10). The UCSB-EFP also produces annual estimates of the number of wage and salary employees involved in tourism and the average annual salaries they receive. UCSB-EFP produces these estimates for both Santa Barbara and Ventura counties. The third source of information is produced for the California Department of Finance by a firm named Dean Runyan and Associates. The results for each county in California are posted annually on the California Department of Finance's World Wide Web site. A basic problem with the UCSB-EFP and the California Department of Finance estimates is that they do not provide definitions of what they are measuring.

Table 10. Southern Santa Barbara County Tourism: Visitors and Expenditures

	1990	1994	1997	1998	2002	2006
<b>Total Visitors Per Day</b>	17,885	18,293	20,279	20,394	23,292	24,326
Overnight Visitors Per Day	7,643	7,818	8,666	8,715	9,954	10,396
Daily Visitors Per Day	10,242	10,476	11,613	11,679	13,338	13,931
<b>Annual Person-visits</b>	6,528,025	6,676,945	7,401,835	7,443,810	8,501,580	8,878,990
<b>Expenditures (Millions \$)</b>						
Overnight Visitor	173.1	186.2	248.1	263.6	361.4	468.8
Daily Visitor	55.9	64.1	74.6	76.1	95.8	110.0
Total Visitor	229.0	250.2	322.7	339.7	457.2	578.7
<b>Expenditures (Millions 1999 \$)</b>						
Overnight Visitor	219.8	208.5	258.0	268.9	340.2	401.7
Daily Visitor	71.0	71.8	77.6	77.6	90.2	94.2
Total Visitor	290.8	280.2	335.6	346.5	430.4	495.8
<b>Growth Rate (%)</b>	1990-1994	1994-1998	1998-2002	2002-2006		
Annual Person-visits	2.3	11.5	14.2	4.4		
Expenditures (1999 \$)	-3.6	23.6	24.2	15.2		

Source: UCSB, Economic Forecast Project, 1999 Economic Outlook for Santa Barbara County.

Estimates of employment and average salaries are summarized from the California Department of Finance (CDF) and UCSB-EFP in Table 11. In 1997, CDF estimates tourism employment in Santa Barbara County of 11,450 versus UCSB-EFP's estimate of 16,836. CDF estimates the average wage and salary of those employed Santa Barbara tourism at \$15,470 versus an estimate of \$14,941 by UCSB-EFP. The differences for Ventura County differ even greater. Because we have more information for Santa Barbara County we attempted to reconcile these estimates.

Table 11. Tourism Employment and Wages & Salaries for Santa Barbara  
And Ventura Counties, 1997

1997 Employment			
County	CA Dept. of Finance	UCSB-EFP	NOAA
Santa Barbara	11,450 (4.9%)	16,836 (7.2%)	4,752 (2.0%) – 5,400 (2.3%)
Ventura	8,930 (2.5%)	24,447 (6.7%)	N/A
1997 Average Wage & Salary			
Santa Barbara	\$15,470	\$14,941	
Ventura	\$15,748	\$12,053	

Sources: California Department of Finance (<http://www.dof.ca.gov>) and University of California – Santa Barbara, Economic Forecast Project (UCSB-EFP), 1999  
Economic Outlook Santa Barbara and Ventura Counties.

One method of checking the information is to estimate the wages-to-sales ratio from tourism spending, i.e., the ratio of wages and salaries generated directly by the visitor spending to the visitor spending. We then compare this ratio to studies of tourism elsewhere. For comparison, we chose the Florida Keys because Santa Barbara visitors had similar demographic, length of trip and spending profiles and the wages-to-sales ratios and wages-to-employment ratios by industry for the industries impacted by tourist spending are quite similar for Monroe County, Florida (location of the Florida Keys) and Santa Barbara County using the 1997 Census of Business, and the authors have conducted a very detailed study of tourism in the Florida Keys.

Using the number of employees and the average wages and salaries, we can estimate the total wages and salaries from tourism for the two sources. We have an estimate of sales or spending by visitors for Santa Barbara County. In 1997, the CDF estimate of wages is \$177.13 million and the UCSB-EFP estimate is \$251.55 million for Santa Barbara County. Santa Barbara County tourism spending was estimated to have been \$322.7 million in 1997, so this would yield wages-to-sales ratios of 0.55 from CDF and 0.78 from UCSB-EFP. In comparison, the Florida Keys estimate was 0.22. It would appear that both the CDF and UCSB-EFP estimates are much too high. However, as stated above, we are not sure what the definitions are of impact. The Florida Keys ratio is for direct impact. If the CDF and UCSB-EFP estimates include multiplier impacts, this might explain the disparity.

The CDF does estimate expenditures as well but the data available on their Web site is 1998. In 1998, CDF estimates that Santa Barbara County had a tourism expenditure impact of \$990.9 million, a wages and salaries impact of \$173.3 million and an employment impact of 10,990. These estimates yield a wages-to-sales ratio of 0.175. This is much closer to the Florida Keys estimate. The Santa Barbara Conference & Visitors Bureau's spending estimate for 1998 (as published in UCSB-EFP) was \$346.5 million. If we assume that the CDF estimate of spending includes multiplier impacts and the UCSB-EFP estimate of spending is direct impact, a output/sales multiplier of 2.85 is implied. This seems a bit high but within the range of known multipliers for counties like Santa Barbara.

As an alternative, we used a range of wages-to-sales ratio for Santa Barbara County for tourism direct impacts of between 0.22 and 0.25 in combination with estimate of wages-to-employment for tourism for Santa Barbara County from UCSB-EFP to derive an alternative estimate of employment. Using this method, we estimate a direct employment impact from tourism of between 4,752 and 5,400 which is

between 2.0% and 2.3% of the total employment in Santa Barbara County. If we assume, that the CDF estimates of employment represent the total employment impact from tourism (includes multiplier impacts), tourism accounted for 4.9% of the total employment in Santa Barbara County in 1997. If we extend these same methods to Ventura County, we would get an estimate of direct employment impact of about 1% of employment and a total impact of 2.5% of employment.

It is our preliminary conclusion, that tourism recreation accounts for between 2 % and 5% of the employment of Santa Barbara County and between 1% and 2.5% of Ventura County employment. We also conclude that the UCSB-EFP estimates of tourism employment do not appear to be credible no matter what the definition. Tourism/recreation appear to be small proportions of the two local economies. Further, marine related tourism/recreation will be some sub-set of these estimates. So as with commercial fishing and offshore oil and gas, impacts of CINMS regulations that negatively impact tourism/recreation may not have significant impacts on the local economies. However, this conclusion is more guarded for this use because unlike commercial fishing which are trending downwards, tourism/recreation is trending upwards and is growing in importance each year. Santa Barbara County tourist visitation increased 14 % between 1990 and 1998 and is expected to increase over 19% between 1998 and 2006. Tourist expenditures increased 19% between 1990 and 1998 (constant 1999 \$) and are expected to increase by 43% between 1998 and 2006. This is much faster than the projected growth for the overall Santa Barbara County economy. Thus, tourism/recreation is becoming increasingly important to the local economies.

Our next task is to identify how much of the tourism/recreation is currently related to marine resource uses.

*Marine Related Recreation.* Generally we know from past studies that recreational fishing, diving (both consumptive and non consumptive), and wildlife watching take place in the CINMS. Quantitative estimates of the amount of activity in the CINMS or in the general area off the coast of Santa Barbara and Ventura counties are few in number and often incomplete. More is known about recreational fishing than for diving or wildlife watching. There was some information available for diving, but we were not able to uncover any information on the extent of wildlife watching activities. Below we summarize some preliminary estimates we made for recreational fishing and diving and the economic impacts using the studies we were able to find combined with a few assumptions. We consider these estimates to be rough approximations. There is some double-counting between recreational fishing and diving because spearfishing activity is included in both recreational fishing and diving.

*Marine Recreational Fishing.* For estimates of recreational fishing activity, there are two main sources of information at the State level; the National Marine Fisheries Service, Marine Recreational Fisheries Statistics Survey (MRFSS) and the U.S. Fish and Wildlife Service, Survey of Fishing, Hunting and Wildlife Associated Activity (USFWS-SFHW). MRFS is an annual on-going survey done in two-month waves, while USFWS-SFHW is done every five years. MRFS measures trips and catch. Trips are equivalent to days in MRFS. USFWS-SFHW measures number of anglers, days and spending. MRFS population is all fishermen, whereas USFWS-SFHW is only fishing by U.S. households. Therefore, MRFS estimates of trips should always exceed those estimated by USFWS-SFHW.

Between 1993 and 1998, marine recreational fishing trips declined by 26.4% according to MRFS (See Table 12). Private/Rental boat trips declined 18.4%, Charter/Party boat trips declined 42.6% and shore fishing trips declined 21.4%. Catch, as measured by the number of fish caught, showed declines in 10 of the 20 species reported by MRFS. Seven of the species had no trends and three had upward trends (Table 13). As a measure of quality of catch, mean length is reported. Thirteen (13) of the 20 species reported showed no trend in mean length, six (6) had upward trends and one (1) had a downward trend. Among the top six species caught in both 1993 and 1998 (in terms of number of fish), all had downward trends except barred surf perch. Overall, both trips and catch show a strong downward trend.

Table 12. Number of Marine Recreational Fishing Trips in Southern California: 1993 – 1998

Year	Total	Private/ Rental Boat	Charter/ Party Boat	Shore
1993	4,037,548	1,625,306	1,174,125	1,238,118
1994	4,748,031	1,931,685	1,200,634	1,615,712
1995	4,300,264	1,700,620	1,128,652	1,470,991
1996	3,768,537	1,478,258	889,256	1,401,024
1997	3,232,417	1,274,901	788,071	1,169,445
1998	2,972,828	1,325,482	673,813	973,533

Percent Change 1993 - 1998

-26.4	-18.4	-42.6	-21.4
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Source: National Marine Fisheries Service, Marine Recreational Fisheries Statistics Survey (MRFSS) (<http://www.st.nmfs.gov/st1>)

Table 13. Summary of Trends in Marine Recreational Catch in Southern California, 1993 – 1998

1993	Ranking 1998	Species	Number	Mean Length
1	1	Chub Mackerel	down	no trend
2	2	Kelp Bass	down	no trend
3	3	Barred Sand Bass	down	no trend
4	5	White Croaker	down	no trend
5	6	Pacific Bonito	down	up
6	4	Barred Surf Perch	up	up
7	7	Vermillion Rockfish	down	no trend
8	13	Bocaccio	down	no trend
9	8	Pacific Sanddab	no trend	no trend
10	9	California Sheepshead	no trend	no trend
11	18	Chilipepper Rockfish	down	no trend
12	11	Copper Rockfish	no trend	no trend
13	10	Yellowfin Tuna	no trend	down
14	15	Lingcod	no trend	up
15	14	Dolphin	no trend	up
16	17	Brown Rockfish	down	no trend
17	16	Gopher Rockfish	up	no trend
18	12	Blue Rockfish	no trend	no trend
19	20	Canary Rockfish	down	up
20	19	Yellowtail Rockfish	up	up

But is the above signal or noise. The USFWS-SFHW for years 1991 and 1996 actually shows an increase in the number of marine recreational fishing days in California. Between 1991 and 1996, days increased an estimated 27.88 percent (Table 14). We checked the MRFSS for all of California just in case the declines estimated for Southern California were different from what was happening statewide. The same downward trends appeared in the statewide estimates of trips from the MRFSS. Thus, we have two conflicting stories about marine recreational fishing in California. In addition, comparing statewide estimates of days and trips for year 1996 from both sources yields inconsistent estimates. MRFSS estimates 5.76 million trips and USFWS-SFHW estimates 7.03 million days (remember MRFSS definition of trips is a day). The USFWS-SFHW estimate should be lower because it only includes fishing by U.S. households, whereas the MRFSS includes all fishermen, including foreign visitors. These inconsistencies in both the absolute estimates and the trends are disturbing, but we cannot resolve them here. We simply will have to work with these estimates as best available and consider them rough approximations.

Table 14. Saltwater Anglers and Days Fishing in California: 1991 – 1996

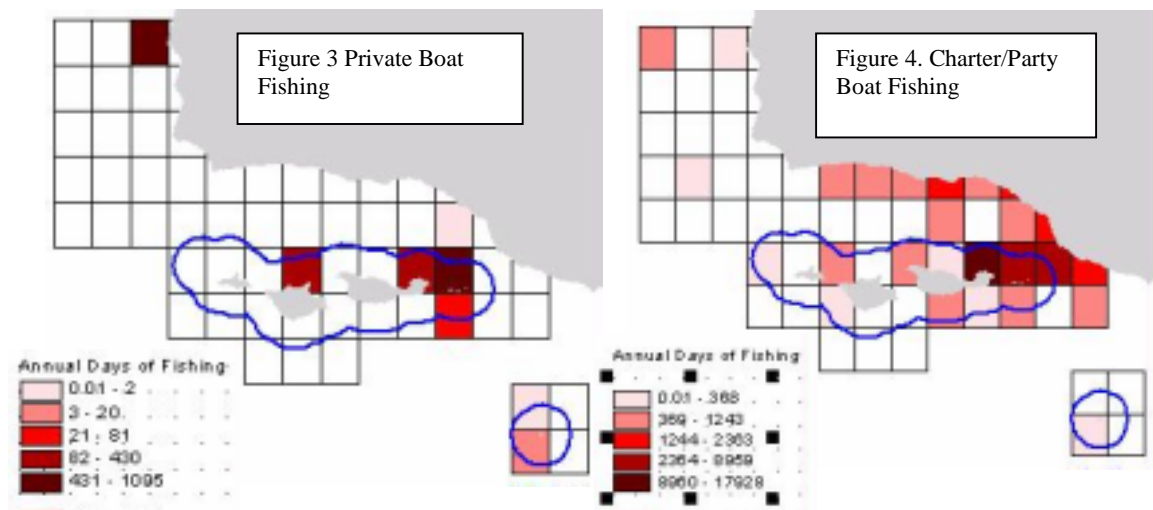
	1991	1996	% Change 1991 - 1996
Anglers (000's)	1,057	1,049	-0.76
Residents	979	937	-4.29
Non Residents	78	112	43.59
Days (000's)	5,499	7,032	27.88
Residents	5,235	6,992	33.56
Non Residents	264	310	17.42

Source: U.S. Department of Interior, Fish and Wildlife Service, 1991 and 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

Beginning in 1999, the MRFSS included information on the spatial distribution of activity using Angler-reported GPS and Loran coordinates. Using the California Department of Fish and Game (CDFG) 10 by 10 mile grids and the definitions of the Marine Reserve Study Area (MRSA) and the Boundary Expansion Study Area (BESA), we developed estimates of the amount of recreational fishing activity (fishing days) for each study area. We use the control totals from the 1997 MRFSS for Charter/Party boat and Private/Rental boat modes and the 1999 MRFSS sample distributions for Southern California, the MRSA and the BESA to derive estimates of activity for 1997 (Table 15). The distributions of private/rental boat days are shown in Figure 3 and the charter/party boat days are shown in Figure 4.

<b>Table 15. Aggregate Annual Person Days of Fishing</b>		
	<b>Charter/Party Boat Fishing</b>	<b>Private/Rental Boat Fishing</b>
<b>S. CA Region</b>		
Population	673,813	1,325,482
MRFSS (Location Subsample) <sup>1</sup>	7,460	430,898
<b>Boundary Expansion Study Area</b>		
MRFSS (Location Subsample) <sup>1</sup>	176	14,479
Percentage of MRFSS <sup>2</sup>	2.36	3.36
Population estimate	15,902	44,536
<b>Marine Reserve Study Area</b>		
MRFSS (Location Subsample) <sup>1</sup>	1,947	31,977
Percentage of MRFSS <sup>2</sup>	26.10	7.42
Population estimate	175,865	98,351

1. These rows show the subsample of the MRFSS dataset for which location information (latitude and longitude) are available.
2. These rows show the study area in question as a percentage of the MRFSS (Location Subsample) for Southern California.



Next, we derived estimates of total income and employment impacts on the local county economies. To do this, we first needed spending profiles for recreational fishing. We developed spending profiles from two main sources. For lodging and eating and drinking expenses, we used the average per person per day values reported by the Santa Barbara Conference & Visitors Bureau and Film Commission 1999 survey. For all other fishing expenses, we used the spending profiles found in Thomson and Crooke (1991) updated using the CPI. Separate profiles were derived for charter/party boat and private/rental boat modes of fishing. Lodging was not included in the private/rental boat modes since a majority are expected to be residents. Total expenditures are then the number of days times the spending per person-day.

The next step was to derive the direct income and employment impacts. To do this required wages-to-sales ratios and wages-to-employment ratios in each industry. We use the U.S. Bureau of Census, 1997 Economic Census for Santa Barbara County as the source for these ratios. To derive the full direct impact, the ratio of total income-to-wages & salary income and the ratio of proprietors income to proprietors employment. This allows us to account for income and employment impacts on proprietors. This information was obtained from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System for Santa Barbara County.

The final step is to derive the total impacts, including multiplier impacts. We chose arbitrary ranges of multipliers suitable for counties like Santa Barbara and Ventura counties. We chose a range of 2.0 to 2.5 for income multipliers and 1.5 to 2.0 for employment multipliers. Our preliminary estimates here are a bit overstated because an unknown portion of activity will be by resident of Santa Barbara and Ventura counties and spending in the local county of residence does not have multiplier impacts. In our final analyses, we will have to adjust our impact estimates to account for the resident activity.

In developing our estimates, we also used lower and upper bounds for activities and multipliers. Lower and Upper bounds on activity were plus or minus 10 percent from our estimate. As we have done above for other activities, we estimate income and employment as a percent of the total economy in 1997. Here we are not able to do separate estimates for Santa Barbara and Ventura counties, so we divide our estimates by the total income and employment for both counties.

In 1997, we estimate that marine recreational fishing activity in the MRSA between \$51 and 62 million dollars in direct spending by fishermen. This had an income impact of between \$41.75 million and \$48.0 million and an employment impact of between 1,171 and 1,907 full and part-time employees (including proprietors). For the BESA, direct spending was between \$10.484 million and \$12.814 million. This had an income impact of between \$8.184 and \$9.41 million and an employment impact of between 233 and 381 full and part-time employees (Table 16). Across both study areas these impacts were less than one-half of one percent of the income and employment in the Santa Barbara and Ventura county economies. So as with commercial fishing and offshore oil and gas, impacts on marine recreational fishing will not have major impacts on the local economies.

The spreadsheet tables that we used to derive the above impacts are included here as Appendix Tables A.7 to A.14. They serve as example models that we plan to use in estimating impacts of different boundary alternatives for Marine Reserves and for assessing boundary expansion. These spreadsheets can be modified as we obtain better information.

*Marine Recreational Diving.* As noted above, we had less information to work with for diving than for fishing. Two studies were available for diving, one almost 25 years old. The two studies were Wine and Hoban (1976) and Moore (1994). The Moore study was used to get estimates of diver trips/days on charter/party boat operations in the CINMS. Moore provided an estimate of 37,192 diving trips/days for year 1993. Unlike marine recreational fishing, there are no broader estimates for Southern California nor time series data to assess trends. We decided to use a range of 35,000 to 45,000 charter/party boat diver trips/days as our lower and upper bound estimates for 1997. For private boat diver trips/days, we used the ratio of diver days to angler days (.10097) for the Santa Barbara/Ventura County Area found in Wine and Hoban (1976). The Wine and Hoban study was on recreational fishing and diving from privately owned boats. For the BESA, we use the charter/party boat diver days to private boat diver days ratio from the MRSA to derive diver days for the charter/party boat mode.

In 1997, we estimate between 43,937 and 55,924 diver days in the MRSA. Divers spent between \$2.19 million and \$2.784 million in the local economies. This had an income impact of between \$4.695 million and \$5.668 million and an employment impact of between 188 and 322 full and part-time employees (including proprietors). For the BESA, we estimate between 19,896 and 25,321 diving days with a total direct spending impact of between \$2.917 million and \$3.736 million. This had an income impact of between \$2.126 million and \$2.567 million and an employment impact of between 233 and 381 full and part-time employees (including proprietors). See Table 16. Recreational diving only accounts for a fraction of a percent of the income and employment in Santa Barbara and Ventura counties.

Table 16. Estimated Impact of Recreational Fishing and Diving: CINMS Marine Reserve Study Area And Boundary Expansion Study Area

Study Area/Activity	Days		Expenditures (millions \$)		Total Income (millions \$)		Employment	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
<b>Marine Reserve</b>								
Fishing	246,795	301,637	50.958	62.282	41.750	48.002	1,171	1,907
Charter/Party boat	158,279	193,451	34.744	42.465	29.584	34.014	819	1,334
Private/Rental boat	88,516	108,186	16.214	19.817	12.166	13.988	352	573
Diving	43,937	55,924	2.190	2.784	4.695	5.668	188	322
Charter/Party boat	35,000	45,000	1.698	2.183	4.511	5.456	182	312
Private/Rental boat	8,937	10,924	0.492	0.601	0.184	0.212	6	10
Total	290,732	357,561	53.148	65.066	46.445	53.670	1,359	2,229
<b>Boundary Expansion</b>								
Fishing	54,394	66,482	10.484	12.814	8.184	9.410	233	381
Charter/Party boat	14,312	17,492	3.142	3.84	2.675	3.076	74	121
Private/Rental boat	40,082	48,990	7.342	8.974	5.509	6.334	159	260
Diving	19,896	25,321	2.917	3.736	2.126	2.567	86	145
Charter/Party boat	15,849	20,375	2.694	3.464	2.043	2.471	83	141
Private/Rental boat	4,047	4,946	0.223	0.272	0.083	0.096	3	4
Total	74,290	91,803	13.401	16.550	10.310	11.977	319	526

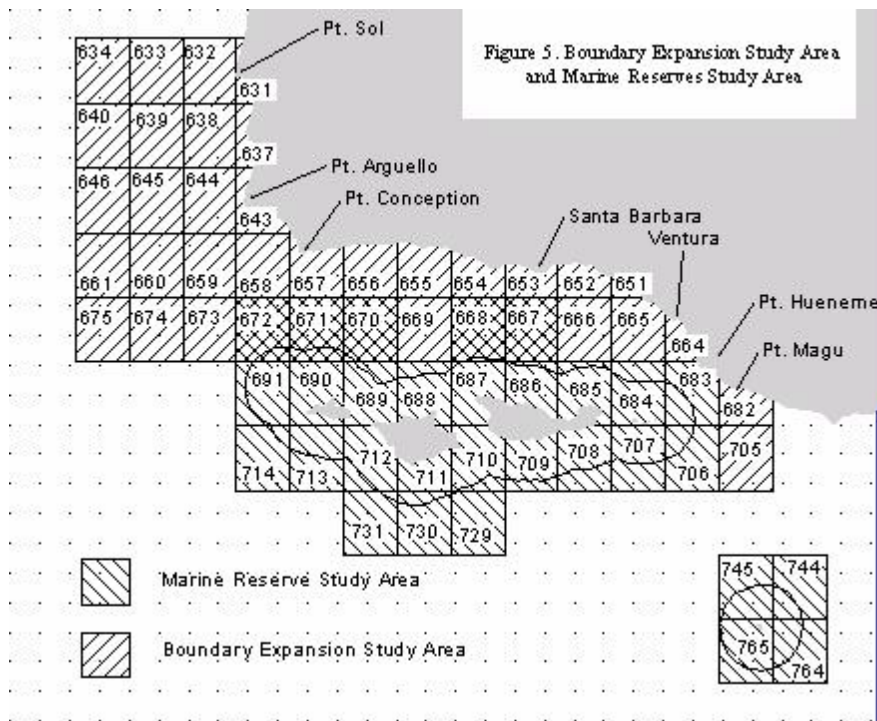
Source: Derived by authors from multiple sources. See text for explanation.

The above information on marine recreational fishing and diving accomplishes much of our goal of connecting the use of natural resources in the CINMS with local impacts on the local economies. There are still several details that need to be addressed. We need to know the actual distributions of activity in the CINMS versus in which county the economic activity associated with the activity takes place. We know that the economic activity will not be limited to just Santa Barbara and Ventura counties. Some impact will take place in Los Angeles and San Diego counties and possibly Orange County (especially trips to Santa Barbara Island). In addition, some of the impacts will be related to activities by residents of the county where the economic activity takes place. There will be no multiplier impacts associated with this spending. There is also one activity for which we have not attempted as yet to quantify. We have no information on the extent of wildlife watching activities, although we have seen or heard stories about the various wildlife watching activities. We have not been able to uncover any quantitative estimates on the extent of this activity. It is hoped that our current primary data collection effort will fill many of these gaps.

### Commercial Fishing in the Marine Reserve and Boundary Expansion Study Areas

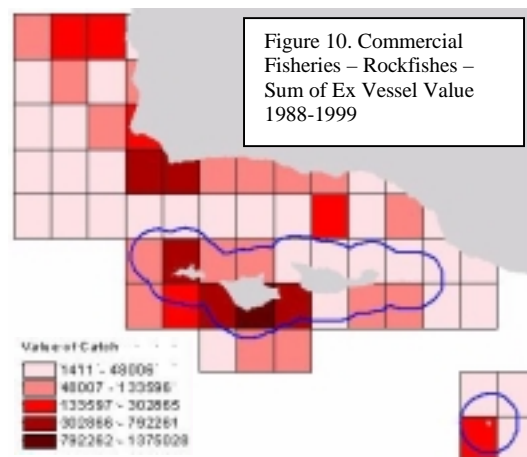
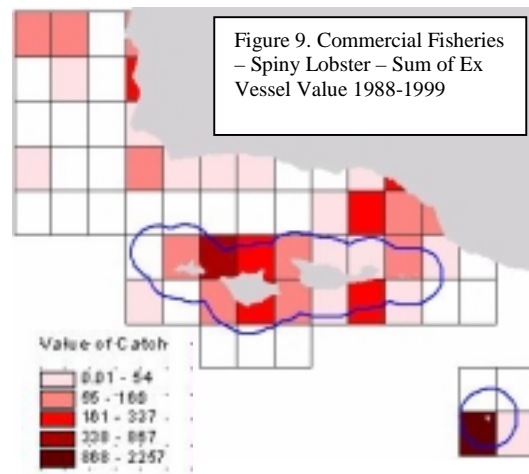
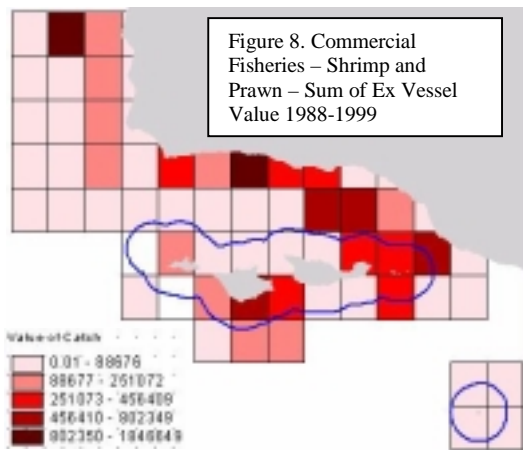
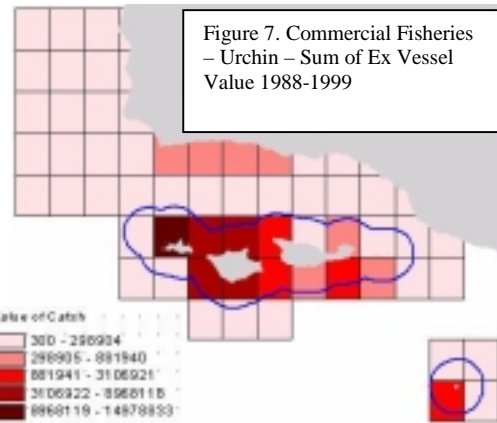
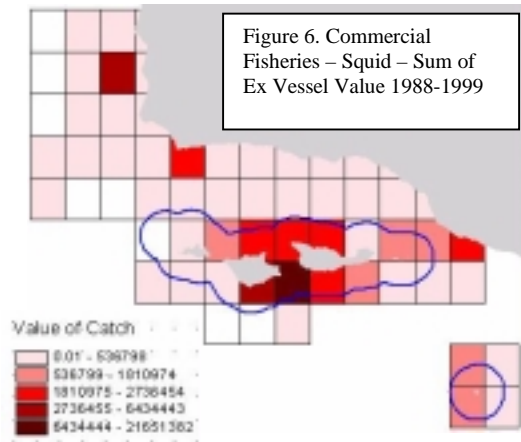
The California Department of Fish and Game (CDFG) collects information on the pounds and ex vessel value of the commercial catch by species and by 10 by 10 mile block where caught. We obtained that information for the CDFG blocks that make up the Marine Reserve Study Area (MRSA) and the Boundary Expansion Study Area (BESA). Because of the size of the blocks and how they overlay on the current CINMS boundary, there is some double counting because we include five blocks in both study areas. In the MRSA, there are 30 CDFG blocks and in the BESA, there are 37 blocks. In all, we obtained

data on 62 CDFG blocks (see Figure 5). Our primary data collection efforts for the MRSA will attempt to bring the spatial resolution down to 1 by 1-mile blocks. The same effort is not being done for the BESA since it is beyond our budget constraint.



The CDFG data was obtained by block and species for years 1988 through 1999. Fishermen that have reviewed our preliminary summaries think that we may not have complete data for year 1999. We have requested updates for year 1999, but have not received the data at the time of this writing. So 1999 may be somewhat understated at this time.

There are many species of fish and invertebrates caught in the two study areas. For summary purposes, we first grouped some species to form 25 species groups. Appendix Table A.15 documents the species in each species group. We then created three views of the data; 1) the sum of pounds and value, by block and species group for years 1988-1999, 2) the 1999 amount of pounds and value by block and species group, and 3) the 1996-1999 average of pounds and value by block and species group. These three views show the time and spatial variability of catch. Figures 6 through 10 show the top five species groups in terms of ex vessel value of catch for 1988-1999 (i.e., sums of the values for 1988-1999). Appendix Tables A.16, A.17 and A.18 show the top 10 species groups, in terms of value, for the MRSA, BESA and for all 62 blocks in both study areas, respectively.



For all species, the 1988-1999 sum of ex vessel value was \$132 million for the MRSA, \$46 million for the BESA and \$176 million for both study areas. This means that \$2 million in ex vessel value would be double-counted if one simply added the totals from the two study areas. Across all 62 blocks, squid was ranked number one (1) in value for 1988-1999, the average for 1996-1999, and in 1999. Urchins were ranked number two (2) and shrimp & prawn was ranked number three (3) for all three time periods. For time periods 1988-1999 and the average for 1996-1999, spiny lobster and rockfishes were ranked numbers four (4) and five (5), respectively. For 1999, spiny lobster and rockfishes slipped to numbers four and five

and flatfish rose to number four. Across all time periods, the top five species groups accounted for between 83 and 87 percent of total value. The top 10 species groups accounted for around 95 percent. Abalone which was ranked ninth, for the time period 1988-1999, was no longer caught from 1997 to 1999. Sea Cucumbers and Anchovy & Sardines replaced Abalone amongst the top ten for the period 1996-1999.

In the Marine Reserve Study Area (MRSA), the top five species groups in terms of value for the period 1988-1999 was urchin, squid, spiny lobster, rockfishes and shrimp & prawn. The top five accounted for between approximately 90 to 94 percent of total ex vessel value of catch from the MRSA. The top 10 species groups accounted for between 96 and 98 percent of the total ex vessel value of catch from the MRSA. Abalone was not caught in the MRSA between 1997 and 1999. Besides not having been caught in these years, Abalone still ranked sixth overall for the period 1988-1999 and still ranked tenth for the average of 1996-1999 in value of catch from the MRSA. Sea Cucumbers have since replaced Abalone and were ranked 12<sup>th</sup> in value for the average of 1996-1999 and 8<sup>th</sup> in 1999 for the MRSA.

In the Boundary Expansion Study Area (BESA), more pelagic species enter the top 10 species groups in terms of ex vessel value of catch. Tuna, sharks, and swordfish were among the top 10. For the period 1988-1999, squid was number one followed by shrimp & prawn, crab, flatfish, urchins, spiny lobsters, rockfishes, tuna, sharks and anchovy & sardines. In 1999, Swordfish and Sea Cucumbers moved up to 6<sup>th</sup> and 10<sup>th</sup>, respectively. The top five species groups accounted for between 68 and 70 percent of value caught in the BESA. The top 10 species groups accounted for between approximately 91 and 93 percent of the total value caught in the BESA.

Squid and urchins are the dominant sources of commercial fishing value in the study areas. The 1996-1999 average annual value of catch was about \$9.8 million for squid and \$4.8 million for urchins. Both species groups combined accounted for, on average, 65.4 percent of the total value of catch from the study areas (43.8 percent for squid and 21.6 percent for urchins). However, squid catch and value is much more variable due to El Nino events. In 1998, the squid catch was 5.66 million pounds with an ex vessel value of \$1.303 million and in 1999 the squid catch was 63.47 million pounds with an ex vessel value of \$17.2 million. Squid also shows significant variability in catch, in both time and space, when comparing the three views (e.g., sum of catch or value 1988-1999, average annual catch or value 1996-1999, or 1999 catch or value). For the period 1988-1999, in the 30 blocks that make up the MRSA, squid catch was not reported in only three of these blocks (e.g., blocks 691, 730 and 731). For the period 1996-1999, squid catch was not reported in five of the 30 blocks in the MRSA (e.g., blocks 672, 691, 713, 730 and 731). And, for 1999, squid catch was not reported for nine of the 30 blocks in the MRSA (e.g., 668, 672, 685, 691, 706, 713, 714, 730 and 731). This kind of variability will make it difficult to assess alternative marine reserve boundaries.

Figure 11. Commercial Fisheries – Squid – Sum of Ex Vessel Value 1988-1999

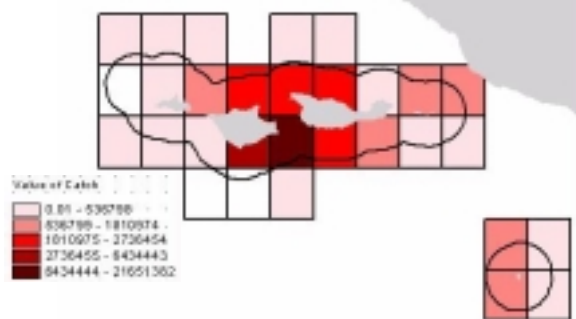


Figure 12. Commercial Fisheries – Squid – Average Annual Ex Vessel Value 1996-1999

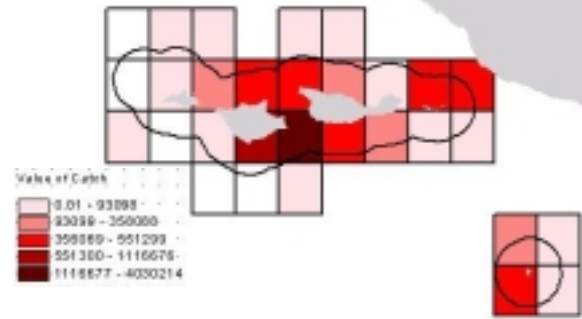


Figure 13. Commercial Fisheries – Squid – 1999 Ex Vessel Value



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Table A.1 1990 Census of Intercounty Commuters for Santa Barbara and Ventura Counties

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**Santa Barbara County**

Total Workers in County	183,655
Total Working Residents of County	179,258
<b>Net Flow of Workers to County</b>	<b>4,397</b>

Residents that Work in the County	169,022
Residents that Commute to Work Outside County	10,236
Surrounding Counties:	7,978
Ventura	2,433
San Luis Obispo	3,584
Kern	186
Los Angeles	1,775
Other Counties:	1,729
Other States:	481
Other Countries:	48

Non Residents that Work Inside County	14,633
Surrounding Counties:	12,546
Ventura	5,594
San Luis Obispo	5,478
Kern	207
Los Angeles	1,267
Other Counties:	1,390

**Ventura County**

Total Workers in County	299,794
Total Working Residents of County	355,186
<b>Net Flow of Workers to County</b>	<b>-55,392</b>

Residents that Work in the County	250,348
Residents that Commute to Work Outside County	84,838
Surrounding Counties:	78,208
Santa Barbara	5,594
Los Angeles	72,353
Kern	261
Other Counties:	5,513
Other States:	912
Other Countries:	205

Non Residents that Work Inside County	29,446
Surrounding Counties:	26,354
Santa Barbara	2,433
Los Angeles	23,635
Kern	286
Other Counties:	2,873

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Table A.2. Average Earnings Per Job, Average Wages & Salaries and Average Nonfarm Proprietors Income for U.S., California, Santa Barbara and Ventura Counties

	U.S.	California	Santa Barbara County	Ventura County
<b>Avg. Earnings Per Job (\$)</b>				
1990	24,531	27,683	25,752	25,381
1994	28,171	30,952	27,036	28,032
1997	30,842	33,744	29,024	30,685
<b>Avg. Wage &amp; Salary (\$)</b>				
1990	23,430	26,239	23,632	24,099
1994	26,528	29,342	24,973	26,608
1997	29,814	32,971	27,562	30,285
<b>Avg. Nonfarm Proprietor's Income (\$)</b>				
1990	17,055	19,815	21,551	16,060
1994	20,098	21,804	21,925	19,002
1997	21,508	23,430	22,993	20,379
<b>Avg. Earnings Per Job (1999 \$)</b>				
1990	31,154	35,157	32,705	32,234
1994	31,552	34,666	30,280	31,396
1997	32,076	35,094	30,185	31,912
<b>Avg. Wage &amp; Salary (1999 \$)</b>				
1990	29,756	33,324	30,013	30,606
1994	29,711	32,863	27,970	29,801
1997	31,007	34,290	28,664	31,496
<b>Avg. Nonfarm Proprietor's Income (1999 \$)</b>				
1990	21,660	25,165	27,370	20,396
1994	22,510	24,420	24,556	21,282
1997	22,368	24,367	23,913	21,194

Table A.3. Personal Income by Industry for California, Santa Barbara and Ventura County: Comparisons 1990, 1994 and 1997

Industry	California			Santa Barbara County			Ventura County		
	1990	1994	1997	1990	1994	1997	1990	1994	1997
Farm	7,005,842	6,812,919	7,507,183	237,461	202,473	291,652	450,821	393,867	402,932
Agricultural Services, Forestry, fish and other	4,683,875	5,465,048	6,314,573	112,051	152,050	146,343	155,989	216,680	259,297
Mining	2,169,653	2,098,118	2,231,096	56,147	71,593	80,209	114,676	136,206	134,263
Construction	30,337,414	25,983,262	30,913,991	363,000	301,431	389,677	694,911	634,118	719,340
Manufacturing	80,850,964	81,727,019	96,393,224	903,182	840,098	871,241	1,186,769	1,261,513	1,542,983
Transportation and Public Utilities	27,172,880	32,625,047	38,288,896	192,556	225,547	261,270	467,074	528,759	547,416
Wholesale trade	29,863,793	31,579,036	37,597,610	217,708	243,225	273,804	419,433	496,587	557,688
Retail trade	44,960,799	48,542,063	54,460,590	538,393	601,777	686,103	862,864	972,086	1,089,610
Finance, Insurance and Real estate	32,857,887	40,950,659	49,628,356	287,244	343,822	390,644	443,763	590,870	697,718
Services	137,928,814	160,540,316	196,643,496	1,792,528	1,938,617	2,227,804	2,102,144	2,871,550	3,352,905
Government	71,523,659	81,670,326	87,997,137	866,933	966,478	1,124,909	1,480,519	1,696,909	1,834,401
Total	469,355,580	517,993,813	607,976,152	5,567,203	5,887,111	6,743,656	8,378,763	9,799,145	11,138,553
Farm	1.5	1.3	1.2	4.3	3.4	4.3	5.4	4	3.6
Agricultural Services, Forestry, fish and other	1	1.1	1	2	2.6	2.2	1.9	2.2	2.3
Mining	0.5	0.4	0.4	1	1.2	1.2	1.4	1.4	1.2
Construction	6.5	5	5.1	6.5	5.1	5.8	8.3	6.5	6.5
Manufacturing	17.2	15.8	15.9	16.2	14.3	12.9	14.2	12.9	13.9
Transportation and Public Utilities	5.8	6.3	6.3	3.5	3.8	3.9	5.6	5.4	4.9
Wholesale trade	6.4	6.1	6.2	3.9	4.1	4.1	5	5.1	5
Retail trade	9.6	9.4	9	9.7	10.2	10.2	10.3	9.9	9.8
Finance, Insurance and Real estate	7	7.9	8.2	5.2	5.8	5.8	5.3	6	6.3
Services	29.4	31	32.3	32.2	32.9	33	25.1	29.3	30.1
Government	15.2	15.8	14.5	15.6	16.4	16.7	17.7	17.3	16.5
Total	100	100	100	100	100	100	100	100	100

Table A.4. Employment by Industry for California, Santa Barbara and Ventura Counties:  
Comparisons: 1994 and 1997 (000's \$ and Percent)

Industry	Santa Barbara County		Ventura County	
	1994	1997	1994	1997
Farm	7,814	10,095	10,313	10,499
Agricultural Services, forestry, fish and other	9,959	8,636	13,149	13,051
Mining	1,514	1,421	2,601	2,121
Construction	9,136	11,077	17,736	19,335
Manufacturing	18,898	19,000	32,778	35,246
Transportation, Communication and Public Utilities	6,265	6,971	13,025	12,428
Wholesale trade	6,416	6,369	14,076	15,168
Retail trade	37,375	39,606	57,354	61,308
Finance, Insurance and Real Estate Services	15,791	16,564	26,463	28,003
Services	71,802	78,550	113,069	117,943
Government	32,380	34,062	49,008	47,895
Federal, Civilian	3,452	3,493	11,053	9,106
Military	4,302	4,348	7,766	7,080
State and Local	24,626	26,221	30,189	31,709
State	7,152	7,449	3,139	2,409
Local	17,474	18,772	27,050	29,219
Total	217,750	232,351	349,572	362,997
Wage and Salary	170,477	180,542	272,117	279,307
Proprietors	47,273	51,809	77,455	83,690
Farm	3.6	4.3	3.0	2.9
Agricultural Services, forestry, fish and other	4.6	3.7	3.8	3.6
Mining	0.7	0.6	0.7	0.6
Construction	4.2	4.8	5.1	5.3
Manufacturing	8.7	8.2	9.4	9.7
Transportation, Communication and Public Utilities	2.9	3.0	3.7	3.4
Wholesale trade	2.9	2.7	4.0	4.2
Retail trade	17.2	17.0	16.4	16.9
Finance, Insurance and Real Estate Services	7.3	7.1	7.6	7.7
Services	33.0	33.8	32.3	32.5
Government	14.9	14.7	14.0	13.2
Federal, Civilian	1.6	1.5	3.2	2.5
Military	2.0	1.9	2.2	2.0
State and Local	11.3	11.3	8.6	8.7
State	3.3	3.2	0.9	0.7
Local	8.0	8.1	7.7	8.0
Total	100.0	100.0	100.0	100.0
Wage and Salary	78.3	77.7	77.8	76.9
Proprietors	21.7	22.3	22.2	23.1

Table A.5. Santa Barbara County Ports - Ex Vessel Value and Total Income Generated (000's \$)

Year	Urchins	Shrimp & Prawn	Spiny Lobster	Sea Cucumbers	Market Squid	Other Crab	Ground-fish	California Halibut	Total Ex Vessel
1988	2,512	234	305	b/	0	182	398	377	5,691
1989	4,140	240	492	b/	0	335	286	352	8,764
1990	6,126	175	679	15	1	585	197	378	10,119
1991	9,637	167	762	31	b/	531	197	333	13,262
1992	9,142	154	773	35	b/	451	236	184	13,584
1993	9,745	180	652	57	b/	505	239	107	14,274
1994	9,035	379	880	54	13	456	552	151	13,804
1995	5,319	400	1,200	127	2	581	413	154	10,217
1996	4,706	777	933	27	524	618	273	166	9,953
1997	3,976	835	1,529	47	354	729	254	219	8,852
1998	2,797	847	966	53	24	736	320	171	6,726

b/less than 3 buyers, not reported for confidentiality reasons.

Total Income		1994	17,739	887	1,696	193	63	1,338	828	313	27,476
	1995	10,531	1,059	2,301	417	9		1,615	544	319	20,724
	1996	9,407	1,914	1,793	94	2,492		1,741	327	348	21,861
	1997	8,112	1,928	2,939	176	1,754		2,043	305	462	19,458
	1998	5,702	1,944	1,881	197	74		2,068	385	365	13,306
Total Income to Ex Vessel Value											
	1994	2.0	2.3	1.9	3.6	4.8		2.9	1.5	2.1	2.0
	1995	2.0	2.6	1.9	3.3	4.5		2.8	1.3	2.1	2.0
	1996	2.0	2.5	1.9	3.5	4.8		2.8	1.2	2.1	2.2
	1997	2.0	2.3	1.9	3.7	5.0		2.8	1.2	2.1	2.2
	1998	2.0	2.3	1.9	3.7	3.1		2.8	1.2	2.1	2.0

Table A.6. Ventura County Ports - Ex Vessel Value and Total Income Generated (000's \$)

Year	Urchins	Shrimp & Prawn	Spiny Lobster	Sea Cucumbers	Market Squid	Other Crab	Ground-fish	California Hailbut	Total Ex Vessel
1988	3,016	189	390	-	3,531	84	735	262	13,379
1989	5,230	390	491	-	2,696	92	1,266	292	12,560
1990	6,204	432	401	b/	1,933	76	1,203	404	11,797
1991	7,139	485	456	45	2,505	128	1,267	471	13,605
1992	7,091	461	412	61	459	204	1,226	311	11,015
1993	6,310	729	419	b/	4,370	99	1,073	292	15,151
1994	6,297	859	283	71	9,396	62	561	326	22,272
1995	5,723	746	514	149	16,321	57	835	354	27,044
1996	4,150	932	476	328	25,556	58	919	512	34,846
1997	3,219	1,318	777	144	12,680	131	922	376	21,659
1998	1,785	1,441	451	255	1,510	202	570	395	7,801
Total Income									
1994	12,359	1,700	544	235	38,311	184	895	672	64,581
1995	11,344	1,544	986	460	68,099	163	1,385	733	90,168
1996	8,342	1,906	915	1,081	92,309	170	1,460	1,070	n/a
1997	6,576	2,602	1,490	526	57,028	373	1,505	787	77,925
1998	3,693	2,875	880	868	4,854	565	896	840	19,487
Income to Ex Vessel Value									
1994	2.0	2.0	1.9	3.3	4.1	3.0	1.6	2.1	2.9
1995	2.0	2.1	1.9	3.1	4.2	2.9	1.7	2.1	3.3
1996	2.0	2.0	1.9	3.3	3.6	2.9	1.6	2.1	n/a
1997	2.0	2.0	1.9	3.7	4.5	2.8	1.6	2.1	3.6
1998	2.1	2.0	2.0	3.4	3.2	2.8	1.6	2.1	2.5

Table A.7. Estimated Economic Impact of Charter/Party Boat Fishing 1997, Marine Reserve Study Area

Expenditure Category	Expenditure Per Person	Lower Bound		Upper Bound		Wages to Sales		Lower Bound		Upper Bound		Wages to Employment		Lower Bound		Upper Bound	
		158,279 Person-days		193,451 Person-days		158,279 Person-days		158,279 Person-days		193,451 Person-days		158,279 Person-days		158,279 Person-days		193,451 Person-days	
	Per Day \$	Total Expenditures \$	Ratio	Total Expenditures \$	Ratio	Wages & Salary	Ratio	Wages & Salary	Ratio	Wages & Salary	Ratio	Wages & Salary	Ratio	Wages & Salary	Ratio	Wages & Salary	Ratio
Boat fees	166.78	26,297,162	0.3331	32,263,198	0.3331	9,320,838	0.3331	11,292,135	0.3331	25,657	0.3331	363.3	0.3331	444.0	0.3331	59.2	0.3331
Fishing equipment	22.22	3,517,259	0.3331	4,298,872	0.3331	1,241,944	0.3331	1,517,932	0.3331	25,657	0.3331	48.4	0.3331	59.2	0.3331	25.6	0.3331
Food, beverages and lodging	16.21	2,566,335	0.1043	3,136,631	0.1043	267,669	0.1043	327,151	0.1043	12,788	0.1043	20.9	0.1043	25.6	0.1043	17.4	0.1043
Transportation	14.30	2,263,501	0.1332	2,766,501	0.1332	301,498	0.1332	368,498	0.1332	17,303	0.1332	17.4	0.1332	21.3	0.1332		
<b>Total</b>	<b>219.51</b>	<b>34,744,257</b>		<b>42,465,203</b>		<b>11,131,949</b>		<b>13,605,716</b>		<b>450</b>		<b>550</b>					
Total Income to Wages & Salary	1.3288					Total Direct Income		Total Direct Income		Total Direct Employment		Total Direct Employment					
Regional Income						14,792,134		18,079,275		545.6		666.9					
Multiplier						Total Income		Total Income		Total Employment		Total Employment					
Lower 2.0						29,584,268		34,014,289		818.5		1,333.8					
Upper 2.5						% Santa Barbara & Ventura Income by Place of Work		% Santa Barbara & Ventura Income by Place of Work		% Santa Barbara & Ventura Employment		% Santa Barbara & Ventura Employment					
Proprietors Income to Total Income by Work	0.154460874					0.1655		0.1903		0.1375		0.2240					
Proprietors Income to Employment	23899.93805					% Santa Barbara & Ventura Income by Place of Residence		% Santa Barbara & Ventura Income by Place of Residence		0.0988		0.1136					
Regional Employment																	
Multiplier																	
Lower 1.5																	
Upper 2.0																	

Table A.8. Estimated Economic Impact of Private Boat Fishing 1997, Marine Reserve Study Area

Expenditure Category	Expenditure Per Person Per Day \$	Lower Bound		Upper Bound		Wages to 88,516 Person-days		Lower Bound		Upper Bound		Wages to 108,186 Person-days		Lower Bound		Upper Bound		Wages to 88,516 Person-days		Upper Bound		Wages to 108,186 Person-days	
		Total Expenditures \$	Ratio	Total Expenditures \$	Ratio	Total Expenditures \$	Ratio	Total Expenditures \$	Ratio	Total Expenditures \$	Ratio	Total Expenditures \$	Ratio	Total Expenditures \$	Ratio	Total Expenditures \$	Ratio	Total Expenditures \$	Ratio	Total Expenditures \$	Ratio	Total Expenditures \$	Ratio
Boat fuel	90.02	7,968,583	0.3531	9,739,380	0.3531	2,813,707	0.3531	3,438,975	0.3531	25,657	0.3531	109.7	0.3531	134.0	0.3531	109.7	0.3531	134.0	0.3531	109.7	0.3531	134.0	0.3531
Fishing equipment	38.63	3,419,759	0.3531	4,179,706	0.3531	1,207,517	0.3531	1,475,854	0.3531	25,657	0.3531	47.1	0.3531	57.5	0.3531	47.1	0.3531	57.5	0.3531	47.1	0.3531	57.5	0.3531
Food, beverages and lodging	33.71	2,984,073	0.1043	3,647,200	0.1043	311,239	0.1043	380,403	0.1043	12,788	0.1043	24.3	0.1043	29.7	0.1043	24.3	0.1043	29.7	0.1043	24.3	0.1043	29.7	0.1043
Transportation	20.81	1,841,899	0.1332	2,251,210	0.1332	245,241	0.1332	299,861	0.1332	17,203	0.1332	14.2	0.1332	17.3	0.1332	14.2	0.1332	17.3	0.1332	14.2	0.1332	17.3	0.1332
<b>Total</b>	<b>183.18</b>	<b>16,214,515</b>		<b>19,817,496</b>		<b>4,577,804</b>		<b>5,595,093</b>		<b>195</b>		<b>239</b>		<b>195</b>		<b>239</b>		<b>195</b>		<b>239</b>		<b>239</b>	
Total Income to Wages & Salary	1.3288																						
Regional Income																							
Multiplier																							
Lower 2.0																							
Upper 2.5																							
Proprietor's Income to Total Income by Work	0.154460874																						
Proprietor's Income to Employment	23899.93805																						
Regional Employment																							
Multiplier																							
Lower 1.5																							
Upper 2.0																							

Table A.9. Estimated Economic Impact of Charter/Party Boat Fishing 1997, Boundary Expansion Study Area

Expenditure Category	Expenditure Per Person	Lower Bound 14,312 Person-days	Upper Bound 17,492 Person-days	Wages to Sales	Lower Bound Wages & Salary	Upper Bound Wages & Salary	Wages to Employment	Lower Bound Person-days	Upper Bound Person-days
Expenditure Category	Per Day \$	Total Expenditures \$	Total Expenditures \$	Ratio	Wages & Salary	Wages & Salary	Ratio	Employment	Employment
Boat fees	166.78	2,386,874	2,917,291	0.3531	842,805	1,030,095	25.657	32.8	40.1
Fishing equipment	22.22	318,036	388,711	0.3531	112,289	137,254	25.657	4.4	5.3
Food, beverages and lodging	16.21	232,052	283,619	0.1043	24,203	29,381	12.788	1.9	2.3
Transportation	14.30	204,669	250,152	0.1332	27,262	33,220	17.303	1.6	1.9
<b>Total</b>	<b>219.51</b>	<b>3,141,632</b>	<b>3,839,773</b>		<b>1,006,569</b>	<b>1,230,751</b>		<b>41</b>	<b>50</b>
Total Income to Wages & Salary	1.3288				Total Direct Income 1,337,529	Total Direct Income 1,634,758		Total Direct Employment 49.3	Total Direct Employment 60.3
Regional Income Multiplier					Total Income 2,675,058	Total Income 3,075,627		Total Employment 74.0	Total Employment 120.6
Lower 2.0					% Santa Barbara & Ventura Income by Place of Work	% Santa Barbara & Ventura Income by Place of Work		% Santa Barbara & Ventura Employment	% Santa Barbara & Ventura Employment
Upper 2.5					0.0150	0.0172		0.0124	0.0203
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier					% Santa Barbara & Ventura Income by Place of Residence	% Santa Barbara & Ventura Income by Place of Residence			
Lower 1.5					0.0089	0.0103			
Upper 2.0									



Table A.11. Estimated Economic Impact of Charter Boat Diving 1997, Marine Reserve Study Area

Expenditure Category	Expenditure Per Person Per Day \$	Lower Bound		Upper Bound		Wages to Sales		Lower Bound		Upper Bound		Wages to Employment		Lower Bound		Upper Bound	
		35,000 Person-days Total Expenditures \$	45,000 Person-days Total Expenditures \$	35,000 Person-days Wages & Salary	45,000 Person-days Wages & Salary	Ratio	Ratio	35,000 Person-days Wages & Salary	45,000 Person-days Wages & Salary	35,000 Person-days Wages & Salary	45,000 Person-days Wages & Salary	35,000 Person-days Employment	45,000 Person-days Employment	35,000 Person-days Employment	45,000 Person-days Employment	35,000 Person-days Employment	45,000 Person-days Employment
Lodging	53.00	1,855,000	2,385,000	0.2781	0.2781			515,876	663,269	14,125	14,125	36.5	36.5	36.5	36.5	47.0	47.0
Eating & Drinking	29.00	1,015,000	1,305,000	0.281	0.281			285,215	366,705	9,186	9,186	31.0	31.0	31.0	31.0	39.9	39.9
Transportation	10.00	350,000	450,000	0.1332	0.1332			46,620	59,940	17,303	17,303	2.7	2.7	2.7	2.7	3.5	3.5
Charter Boat fee	63.00	2,205,000	2,835,000	0.3531	0.3531			778,586	1,001,039	22,657	22,657	30.3	30.3	30.3	30.3	39.0	39.0
Miscellaneous	15.00	525,000	675,000	0.1357	0.1357			71,243	91,598	11,473	11,473	6.2	6.2	6.2	6.2	8.0	8.0
Total	170.00	5,950,000	7,650,000					1,697,539	2,182,550			106.8	106.8	106.8	106.8	137.3	137.3
Total Income to Wages & Salary	13,288			Total Direct Income	Total Direct Income			2,255,689	2,900,172			121.4	121.4			156.1	156.1
Regional Income Multiplier				Total Income	Total Income			4,511,378	5,456,374			182.1	182.1			312.2	312.2
Lower 2.0				% Santa Barbara & Ventura Income by Place of Work	% Santa Barbara & Ventura Income by Place of Work									% Santa Barbara & Ventura Employment	% Santa Barbara & Ventura Employment		
Upper 2.5																	
Proprietors Income to Total Income by Work	0.154460874																
Proprietors Income to Employment	23899.93805																
Regional Employment Multiplier																	
Lower 1.5																	
Upper 2.0																	

Estimated Economic Impact of Private Boat Diving 1997, Marine Reserve Study Area

Expenditure Category	Expenditure Per Person	Lower Bound 68,000 Person-days	Upper Bound 75,000 Person-days	Wages to Sales Ratio	Lower Bound 68,000 Person-days Wages & Salary	Upper Bound 75,000 Person-days Wages & Salary	Wages to Employment Ratio	Lower Bound 68,000 Person-days Employment	Upper Bound 75,000 Person-days Employment
Boat Gas & Oil	19.00	1,292,000	1,425,000	0.0567	73,256	80,798	12,788	5.7	6.3
Air Refill	7.00	476,000	525,000	0.3531	168,076	185,378	25,657	6.6	7.2
Ice	2.50	170,000	187,500	0.1043	17,731	19,556	12,788	1.4	1.5
Boat Ramp Fee	1.50	102,000	112,500	0.3531	36,016	39,724	25,657	1.4	1.5
Food & Drink	11.00	748,000	825,000	0.1043	78,016	86,048	18,233	4.3	4.7
Auto Gas	9.00	612,000	675,000	0.0567	34,700	38,273	12,788	2.7	3.0
Equipment Rental	5.00	340,000	375,000	0.3531	120,054	132,413	25,657	4.7	5.2
Total	55.00	3,740,000	4,125,000		527,850	582,188		26.7	29.5
Total Income to Wages & Salary	13288				701,407	773,611		31.3	34.5
Regional Income Multiplier									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Employment					701,407	773,611			
Total Employment									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
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Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
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Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									
Upper 2.5									
Proprietors Income to Total Income by Work	0.154460874								
Proprietors Income to Employment	23899.93805								
Regional Employment Multiplier									
Lower 1.5									
Upper 2.0									
Total Direct Income					701,407	773,611			
Total Income									
Lower 2.0									

Table A.13. Estimated Economic Impact of Charter Boat Diving 1997, Boundary Expansion Study Area

Expenditure Category	Expenditure Per Day \$	Lower Bound		Upper Bound		Wages to Sales		Lower Bound		Upper Bound		Wages to Employment		Lower Bound		Upper Bound	
		15 849 Person-days	Total Expenditures \$	20 375 Person-days	Total Expenditures \$	Ratio	Ratio	15 849 Person-days	Wages & Salary	20 375 Person-days	Wages & Salary	Employment	Ratio	15 849 Person-days	Employment	20 375 Person-days	Employment
Lodging	53.00	839,997		1,079,875	0.2781			233,603		300,313		14,125		16.5		21.3	
Eating & Drinking	29.00	459,621		590,875	0.281			129,154		166,036		9,186		14.1		18.1	
Transportation	10.00	158,490		203,750	0.1332			21,111		27,140		17,303		1.2		1.6	
Charter Boat fee	63.00	998,487		1,283,625	0.3331			352,566		453,248		25,637		13.7		17.7	
Miscellaneous	15.00	237,735		305,625	0.1357			32,261		41,473		11,473		2.8		3.6	
Total	170.00	2,694,330		3,463,750				768,694		988,210		48.4		48.4		62.2	
Total Income to								Total Direct Income		Total Direct Income		Total Direct Employment		Total Direct Employment		Total Direct Employment	
Wages & Salary	13,288							1,021,440		1,313,133		55.0		55.0		70.7	
Regional Income																	
Multiplier								Total Income		Total Income		Total Employment		Total Employment		Total Employment	
Lower 2.0								2,642,881		2,470,525		82.5		82.5		141.3	
Upper 2.5																	
Proprietors Income to								% Santa Barbara &		% Santa Barbara &		% Santa Barbara &		% Santa Barbara &		% Santa Barbara &	
Total Income by Work	0.15446087							Ventura Income by		Ventura Income by		Ventura Employment		Ventura Employment		Ventura Employment	
Proprietors Income								Place of Work		Place of Work							
to Employment	23899.938							0.0114		0.0138		0.0139		0.0139		0.0237	
Regional Employment																	
Multiplier								% Santa Barbara &		% Santa Barbara &							
Lower 1.5								Ventura Income by		Ventura Income by							
Upper 2.0								Place of Residence		Place of Residence							
								0.0068		0.0083							



Table A. 15. Species Included in Each Species Group for Commercial Fisheries Analyses

Species Group Code	Species Group Name	CDFG Species Code	Common Name	Scientific Name
1	Tuna	1	Tuna, yellowfin	<i>Thunnus albacares</i>
		2	Tuna, skipjack	<i>Katsuwonus pelamis</i>
		3	Bonito, Pacific	<i>Sarda chilienis</i>
		4	Tuna, bluefin	<i>Thunnus thynnus</i>
		5	Tuna, albacore	<i>Thunnus alalunga</i>
		6	Tuna, unspecified	<i>Scombridae</i>
		8	Tuna, bigeye	<i>Thunnus obesus</i>
		9	Tuna, skipjack, black	<i>Euthynnus lineatus</i>
2	Mackerel	19	Mackerel, bullet	<i>Auxis rochei</i>
		50	Mackerel, unspecified	<i>Scomber / Trachurus</i>
		51	Mackerel, Pacific	<i>Scomber japonicus</i>
		55	Mackerel, jack	<i>Trachurus symmetricus</i>
3	Sharks	96	Shark, white	<i>Carcharodon carcharias</i>
		97	Shark, bigeye thresher	<i>Alopias superciliosus</i>
		98	Shark, pelagic thresher	<i>Alopias pelagicus</i>
		150	Shark, unspecified	<i>Selachii spp.</i>
		151	Shark, shortfin mako	<i>Isurus oxyrinchus</i>
		152	Shark, spiny dogfish	<i>Squalus acanthias</i>
		153	Shark, leopard	<i>Triakis semifasciata</i>
		154	Shark, brown smoothhound	<i>Mustelus henlei</i>
		155	Shark, thresher	<i>Alopias vulpinus</i>
		156	Shark, basking	<i>Cetorhinus maximus</i>
		158	Shark, smooth hammerhead	<i>Sphyrna zygaena</i>
		159	Shark, soupfin	<i>Galeorhinus zyopterus</i>
		161	Shark, sixgill	<i>Hexanchus griseus</i>
		162	Shark, sevengill	<i>Notorynchus cepedianus</i>
		163	Shark, swell	<i>Cephaloscyllium ventriosum</i>
		165	Shark, Pacific angel	<i>Squatina californica</i>
		167	Shark, blue	<i>Prionace glauca</i>
		169	Shark, horn	<i>Heterodontus francisci</i>
		179	Shark, gray smoothhound	<i>Mustelus californicus</i>
4	Rays & Skates	170	Ray, unspecified	<i>Rajiformes</i>
		171	Ray, bat	<i>Myliobatis californica</i>
		172	Ray, Pacific electric	<i>Torpedo californica</i>
		174	Guitarfish, shovelnose	<i>Rhinobatos productus</i>
		175	Skate, unspecified	<i>Rajidae</i>
5	Rockfishes	245	Rockfish, cowcod	<i>Sebastes levis</i>
		246	Rockfish, copper (whitebelly)	<i>Sebastes caurinus</i>
		247	Rockfish, canary	<i>Sebastes pinniger</i>
		249	Rockfish, vermilion	<i>Sebastes miniatus</i>
		250	Rockfish, unspecified	<i>Sebastes spp.</i>

Table A. 15. (continued)

Species Group Code	Species Group Name	CDFG Species Code	Common Name	Scientific Name
5	Rockfishes <sup>1</sup> (continued)	251	Rockfish, black-and-yellow	<i>Sebastes chrysomelas</i>
		252	Rockfish, black	<i>Sebastes melanops</i>
		253	Rockfish, bocaccio	<i>Sebastes paucispinis</i>
		254	Rockfish, chilipepper	<i>Sebastes goodei</i>
		255	Rockfish, greenspotted	<i>Sebastes chlorostictus</i>
		256	Rockfish, starry	<i>Sebastes constellatus</i>
		257	<i>Rockfish, darkblotched</i>	<i>Sebastes crameri</i>
		258	Rockfish, China	<i>Sebastes nebulosus</i>
		259	Rockfish, yellowtail	<i>Sebastes flavidus</i>
		260	Rockfish, California	<i>Scorpaena guttata</i>
		261	Cabezon	<i>Scorpaenichthys marmoratu</i>
		262	Thornyheads	<i>Sebastolobus spp.</i>
		263	Rockfish, gopher	<i>Sebastes carnatus</i>
		264	Rockfish, pinkrose	<i>Sebastes simulator</i>
		265	Rockfish, yelloweye	<i>Sebastes ruberrimus</i>
		267	Rockfish, brown	<i>Sebastes auriculatus</i>
		268	Rockfish, rosy	<i>Sebastes rosaceus</i>
		269	Rockfish, widow	<i>Sebastes entomelas</i>
		270	Rockfish, splitnose	<i>Sebastes diploproa</i>
		651	Rockfish, olive	<i>Sebastes serranoides</i>
		652	Rockfish, grass	<i>Sebastes rastrelliger</i>
		653	Rockfish, pink	<i>Sebastes eos</i>
		654	Rockfish, greenstripped	<i>Sebastes elongatus</i>
		655	Rockfish, copper	<i>Sebastes caurinus</i>
		657	Rockfish, flag	<i>Sebastes rubrivinctus</i>
		658	Rockfish, treefish	<i>Sebastes serriceps</i>
		659	Rockfish, kelp	<i>Sebastes atrovirens</i>
		660	Rockfish, honeycomb	<i>Sebastes umbrosus</i>
		661	Rockfish, greenblotched	<i>Sebastes rosenblatti</i>
		662	Rockfish, bronzespotted	<i>Sebastes gilli</i>
		663	Rockfish, bank	<i>Sebastes rufus</i>
		664	Rockfish, rosethorn	<i>Sebastes helvomaculatus</i>
		665	Rockfish, blue	<i>Sebastes mystinus</i>
		666	Rockfish, squarespot	<i>Sebastes hopkinsi</i>
		667	Rockfish, blackgill	<i>Sebastes melanostomus</i>
		668	<i>Rockfish, stripetail</i>	<i>Sebastes saxicola</i>
		669	Rockfish, speckled	<i>Sebastes ovalis</i>
		670	Rockfish, swordspine	<i>Sebastes ensifer</i>
		671	Rockfish, calico	<i>Sebastes dallii</i>
		672	Rockfish, shortbelly	<i>Sebastes jordani</i>
		673	Rockfish, chameleon	<i>Sebastes phillipsi</i>
		674	Rockfish, aurora	<i>Sebastes aurora</i>
		675	Rockfish, redbanded	<i>Sebastes babcocki</i>
		678	Thorneyhead, longspine	<i>Sebastolobus altivelis</i>
		679	Thorneyhead, shortspine	<i>Sebastolobus alascanus</i>

Table A. 15. (continued)

Species Group Code	Species Group Name	CDFG Species Code	Common Name	Scientific Name
5	Rockfishes (continued)	956	Rockfish, group bocaccio/chili	<i>Sebastes/group</i>
		957	Rockfish, group bolina	<i>Sebastes/group</i>
		958	Rockfish, group deepwater reds	<i>Sebastes/group</i>
		959	Rockfish, group red	<i>Sebastes/group</i>
		960	Rockfish, group small	<i>Sebastes/group</i>
		961	Rockfish, group rosefish	<i>Sebastes/group</i>
		962	Rockfish, group gopher	<i>Sebastes/group</i>
		970	Rockfish, quillback	<i>Sebastes maliger</i>
		971	Rockfish, group canary/vermili	<i>Sebastes/group</i>
		972	Rockfish, group black/blue	<i>Sebastes/group</i>
6	Sculpin & Bass	272	Sculpin, staghorn	<i>Leptocottus armatus</i>
		273	Sculpin, yellowchin	<i>Icelinus quadriseriatus</i>
		275	Bass, rock	<i>Paralabrax spp.</i>
		276	Bass, spotted sand	<i>Paralabrax maculatofasciat</i>
		277	Bass, kelp	<i>Paralabrax clathratus</i>
		278	Bass, barred sand	<i>Paralabrax nebulifer</i>
		280	Bass, giant sea	<i>Stereolepis gigas</i>
		400	Seabass, white	<i>Atractoscion nobilis</i>
7	Salmon	300	Salmon	<i>Oncorhynchus spp.</i>
		301	Salmon, chum	<i>Oncorhynchus keta</i>
		302	Salmon, chinook	<i>Oncorhynchus tshawytscha</i>
		303	Salmon, pink	<i>Oncorhynchus goroscha</i>
		304	Salmon, coho	<i>Oncorhynchus kisutch</i>
		306	Salmon, Roe (Chinook and Coho)	<i>Onchorhynchus spp.</i>
8	Crab	341	Crab, red rock	<i>Cancer productus</i>
		342	Crab, yellow rock	<i>Cancer anthonyi</i>
		343	Crab, brown rock	<i>Cancer antennarius</i>
		800	Crab, Dungeness	<i>Cancer magister</i>
		801	Crab, rock unspecified	<i>Cancer spp.</i>
		802	Crab, claws	<i>Cancer spp.</i>
		803	Crab, spider	<i>Loxorhynchus spp.</i>
		804	Crab, king	<i>Paralithodes spp.</i>
		805	Crab, sand	<i>Emerita analoga</i>
		806	Crab, shore	<i>Pachygrapsus crassipes</i>
		807	Crab, pelagic red	<i>Pleuroncodes planipes</i>
		808	Crab, tanner	<i>Chionoecetes tanneri</i>
		809	Crab, box	<i>Lopholithodes foraminatus</i>
9	Shrimp & Prawn	810	Shrimp, bay	<i>Crangonidae</i>
		811	Shrimp, ghost	<i>Callinassa californiensis</i>
		812	Shrimp, Pacific Ocean	<i>Pandalus jordani</i>
		813	Prawn, ridgeback	<i>Eusicyonia ingentus</i>
		814	Shrimp, unspecified	<i>Crustacea</i>

Table A. 15. (continued)

Species Group Code	Species Group Name	CDFG Species Code	Common Name	Scientific Name
9	Shrimp & Prawn (continued)	815	Prawn, spot	<i>Pandalus platyceros</i>
		816	Prawn, golden	<i>Penaeus Californiensis</i>
		817	Shrimp, coonstriped	<i>Pandalus hypsinotus</i>
		818	Shrimp, red rock	<i>Lysmata californica</i>
		819	Shrimp, brine	<i>Artemia salina</i>
10	Spiny Lobster	820	Lobster, California spiny	<i>Panulirus interruptus</i>
11	Urchins	752	Urchin, red	<i>Strongylocentrotus francisc</i>
		753	Urchin, purple sea	<i>Strongylocentrotus purpur</i>
12	Sea Cucumbers	755	Cucumber, sea	<i>Holothuroidea</i>
13	Roundfish	190	Sablefish	<i>Anoplopoma fimbria</i>
		191	Louvar	<i>Luvarus imperialis</i>
		195	Lingcod	<i>Ophiodon elongatus</i>
		290	Greenling, kelp	<i>Hexagrammos decagramm</i>
		495	Whiting, Pacific	<i>Merluccius productus</i>
14	Grenadiers	198	Grenadiers	<i>Macouridae</i>
15	Yellowtail	40	Yellowtail	<i>Seriola lalandi</i>
16	Swordfish	91	Swordfish	<i>Xiphias gladius</i>
17	Flatfish	200	Sole, unspecified	<i>Pleuronectiformes</i>
		201	Flounder, arrowtooth	<i>Atheresthes stomias</i>
		202	Sole, bigmouth	<i>Hippoglossina stomata</i>
		203	Sole, rock	<i>Pleuronectes bilineata</i>
		204	Sole, fantail	<i>Xystreurus liolepis</i>
		205	Sole, sand	<i>Psettichthys melanostictus</i>
		206	Sole, English	<i>Pleuronectes vetulus</i>
		207	Sole, rex	<i>Errex zachirus</i>
		208	Sole, butter	<i>Pleuronectes isolepis</i>
		209	Sole, petrale	<i>Eopsetta jordani</i>
		210	Sole, slender	<i>Eopsetta exilis</i>
		211	Sole, Dover	<i>Microstomus pacificus</i>
		212	Sole, tongue	<i>Symphurus atricauda</i>
		220	Halibut, unspecified	<i>Pleuronectiformes</i>
		221	Halibut, Pacific	<i>Hippoglossus stenolepis</i>
		222	Halibut, California	<i>Paralichthys californicus</i>
		225	Sanddab	<i>Citharichthys spp.</i>
		226	Sanddab, longfin	<i>Citharichthys xanthostigma</i>
		227	Sanddab, Pacific	<i>Citharichthys sordidus</i>
		228	Sanddab, speckled	<i>Citharichthys stigmaeus</i>

Table A. 15. (continued)

Species Group Code	Species Group Name	CDFG Species Code	Common Name	Scientific Name
17	Flatfish (continued)	230	Flounder, unspecified	Pleuronectidae
		231	Flounder, starry	Platichthys stellatus
		235	Turbot, curlfin	Pleuronichthys decurrens
		236	Turbot, diamond	Hypsopsetta guttulata
		237	Sole, C-O	Pleuronichthys coenosus
		238	Turbot, hornyhead	Pleuronichthys verticalis
		239	Turbot, spotted	Pleuronichthys ritteri
		240	Turbot	Pleuronectidae
18	Surf Perch	550	Surfperch, unspecified	Embiotocidae
		551	Surfperch, barred	Amphistichus argenteus
		552	Surfperch, black	Embiotoca jacksoni
		553	Surfperch, redtail	Amphistichus rhodoterus
		554	Surfperch, shiner	Cymatogaster aggregata
		556	Surfperch, white	Phanerodon furcatus
		557	Surfperch, walleye	Hyperprosopon argenteum
		558	Surfperch, rubberlip	Rhacochilus toxotes
		559	Surfperch, pile	Rhacochilus vacca
		560	Surfperch, calico	Amphistichus koelzi
		561	Surfperch, dwarf	Micrometrus minimus
		562	Surfperch, rainbow	Hypsurus caryi
		563	Surfperch, pink	Zalembeus rosaceus
		601	Kahawai	Annipis trutta
		602	Zebraperch	Hermosilla azurea
19	Abalone	700	Abalone	<i>Haliotis</i> spp.
		701	Abalone, black	<i>Haliotis cracherodii</i>
		702	Abalone, red	<i>Haliotis rufescens</i>
		703	Abalone, green	<i>Haliotis fulgens</i>
		704	Abalone, pink	<i>Haliotis corrugata</i>
		705	Abalone, white	<i>Haliotis sorenseni</i>
		706	Abalone, threaded	<i>Haliotis assimilis</i>
		707	Abalone, pinto	<i>Haliotis kamtschatkana</i>
		708	Abalone, flat	<i>Haliotis walallensis</i>
20	Squid	709	Limpet, unspecified	<i>Archaeogastropoda</i>
		710	Squid, jumbo	<i>Doscidicus gigas</i>
		711	Squid, market	<i>Loligo opalescens</i>
21	Octopus	712	Octopus, unspecified	<i>Octopus</i> spp.
22	Mussels & Snails	730	Mussel	<i>Mytilus</i> spp.
		731	Whelk, Kellet's	<i>Kelletia Kelleti</i>
		732	Snail, sea	<i>Gastropoda</i>
		736	Snails, moon	<i>Polinices</i> spp.
		746	Snail, bubble	<i>Bulla gouldiana</i>

Table A.15. (Continued)

Species Group Code	Species Group Name	CDFG Species Code	Common Name	Scientific Name
22	Mussels & Snails (continued)	747	Snail, top	<i>Astraea undosa</i>
		749	Sea hare	<i>Aplysia</i> spp.
		751	Sea stars	Asteroidea
23	Anchovy & Sardines	110	Anchovy, northern	<i>Engraulis mordax</i>
		100	Sardine, Pacific	<i>Sardinops sagax caeruleus</i>
24	Herring & Roe	121	Herring, Pacific	<i>Clupea pallasii</i>
		122	Herring, roe	<i>Clupea pallasii</i>
25	Other <sup>2</sup>	57	Wahoo	<i>Acanthocybium solanderi</i>
		80	Butterfish (Pacific pompano)	<i>Peprilus simillimus</i>
		130	Barracuda, California	<i>Sphyræna argentea</i>
		135	Mullet, striped	<i>Mugil cephalus</i>
		145	Sheephead, California	<i>Semicossyphus pulcher</i>
		166	Ratfish, spotted	<i>Hydrolagus colliei</i>
		184	Jacksmelt	<i>Atherinopsis californiensis</i>
		189	Silversides	Atherinidae
		291	Triggerfish	Balistidae
		324	Shad, threadfin	<i>Dorosoma petenense</i>
		325	Shad, American	<i>Alosa sapidissima</i>
		340	Tilapia	<i>Tilapia</i> spp.
		420	Croaker, unspecified	Sciaenidae
		421	Croaker, black	<i>Cheilotrema saturnum</i>
		430	Grouper	<i>Mycteroperca/Epinephelus</i>
		432	Grouper, Broomtail	<i>Mycteroperca xenarcha</i>
		435	Croaker, white	<i>Genyonemus lineatus</i>
		440	Queenfish	<i>Seriphus politus</i>
		450	Eel	Osteichthyes
		452	Eel, California moray	<i>Gymnothorax mordax</i>
		454	Eel, wolf	<i>Anarrhichthys ocellatus</i>
		456	Eel, monkeyface	<i>Cebidichthys violaceus</i>
		457	Hagfishes	<i>Eptatretus</i> spp.
		467	Opah	<i>Lampris guttatus</i>
		473	Lizardfish, California	<i>Synodus lucioceps</i>
		475	Opaleye	<i>Girella nigricans</i>
		476	Needlefish, California	<i>Strongylura exilis</i>
		478	Halfmoon	<i>Medialuna californiensis</i>
		479	Blacksmith	<i>Chromis punctipinnis</i>
		480	Sargo	<i>Anisotremus davidsonii</i>
		481	Dolphin (fish)	<i>Coryphaena hippurus</i>
		485	Midshipman, planifin	<i>Porichthys notatus</i>
		490	Whitefish, ocean	<i>Caulolatilus princeps</i>
		999	Fish, unspecified	Osteichthyes

1. Species in italics were not caught in any of the study areas.

2. All species under Other were caught in the study areas.

Table A.16. Commercial Fisheries - Top 10 species Based on Ex Vessel Value: Marine Reserve Study Area (MRSA)

Species/Species Group	1988 - 1999		1999		Avg. 1996-1999		Rank	
	Value \$	Percent	Value \$	Percent	Value \$	Percent	1999	1996-1999
Urchin	53,706,734	40.62	3,067,671	13.03	4,543,851	26.06	2	2
Squid	49,105,451	37.14	17,096,714	72.61	8,919,725	51.17	1	1
Spiny Lobster	6,254,721	4.73	418,480	1.78	791,066	4.54	4	4
Rockfishes	5,085,262	3.85	390,674	1.66	577,584	3.31	5	5
Shrimp & Prawn	4,562,922	3.45	1,094,962	4.65	880,059	5.05	3	3
<b>sub-total (TOP 5)</b>	<b>118,715,090</b>	<b>89.78</b>	<b>22,068,501</b>	<b>93.73</b>	<b>15,712,285</b>	<b>90.13</b>		
Abalone	2,547,450	1.93	0	0.00	178,915	1.03	n/a	10
Crab	2,325,292	1.76	233,196	0.99	321,782	1.85	9	6
Other	1,596,934	1.21	122,251	0.52	247,285	1.42	10	7
Anchovy & Sardines	1,170,281	0.89	310,426	1.32	177,946	1.02	6	11
Flatfish	1,124,477	0.85	282,854	1.20	179,817	1.03	7	9
<b>sub-total (6-10)</b>	<b>8,764,434</b>	<b>6.63</b>	<b>948,727</b>	<b>4.03</b>	<b>1,105,745</b>	<b>6.34</b>		
<b>Total TOP 10</b>	<b>127,479,524</b>	<b>96.41</b>	<b>23,017,228</b>	<b>97.76</b>	<b>16,818,030</b>	<b>96.47</b>		
<b>Total TOP 8, excluding Abalone &amp; Other</b>	<b>123,335,140</b>	<b>93.28</b>	<b>22,894,977</b>	<b>97.24</b>	<b>16,391,830</b>	<b>94.03</b>		
<b>Total All Species</b>	<b>132,224,853</b>	<b>100.00</b>	<b>23,545,339</b>	<b>100.00</b>	<b>17,432,970</b>	<b>100.00</b>		
Sea Cucumbers	797,012	0.60	263,762	1.12	176,035	1.01	8	12

Table A.17. Commercial Fisheries - Top 10 species Based on Ex Vessel Value: Boundary Expansion Study Area (BESA)

Species/Species Group	1988 - 1999		1999		Avg. 1996-1999		Rank	
	Value \$	Percent	Value \$	Percent	Value \$	Percent	1999	1996-1999
Squid	10,883,889	23.57	212,706	6.09	895,306	17.17	5	2
Shrimp & Prawn	7,356,600	15.93	1,021,029	29.25	1,270,959	24.38	1	1
Crab	5,589,853	12.10	292,572	8.38	471,238	9.04	4	4
Flatfish	4,477,580	9.70	841,353	24.10	639,593	12.27	2	3
Urchins	4,040,801	8.75	71,952	2.06	286,661	5.50	11	7
<b>sub-total (TOP 5)</b>	<b>32,348,723</b>	<b>70.05</b>	<b>2,439,612</b>	<b>69.89</b>	<b>3,563,757</b>	<b>68.36</b>		
Spiny Lobster	3,607,477	7.81	120,323	3.45	436,889	8.38	8	5
Rockfishes	3,339,266	7.23	148,321	4.25	361,851	6.94	7	6
Tuna	1,432,118	3.10	341,493	9.78	237,113	4.55	3	8
Sharks	1,073,579	2.32	75,394	2.16	122,071	2.34	9	10
Anchovy & Sardines	789,245	1.71	37,870	1.08	123,083	2.36	13	9
<b>sub-total (6-10)</b>	<b>10,241,685</b>	<b>22.18</b>	<b>723,401</b>	<b>20.72</b>	<b>1,281,007</b>	<b>24.57</b>		
<b>Total TOP 10</b>	<b>42,590,408</b>	<b>92.23</b>	<b>3,163,013</b>	<b>90.62</b>	<b>4,844,764</b>	<b>92.93</b>		
Swordfish	455,599	0.99	160,606	4.60	61,237	1.17	6	12
Sea Cucumbers	511,613	1.11	74,893	2.15	63,529	1.22	10	11
<b>Total All Species</b>	<b>46,179,103</b>	<b>100.00</b>	<b>3,490,606</b>	<b>100.00</b>	<b>5,213,164</b>	<b>100.00</b>		

Table A.18. Commercial Fisheries - Top 10 species Based on Ex Vessel Value: All Study Areas

Species/Species Group	1988 - 1999		1999		Avg. 1996-1999		Rank	
	Value \$	Percent	Value \$	Percent	Value \$	Percent	1999	1996-1999
Squid	59,846,781	33.94	17,235,116	64.84	9,782,295	43.80	1	1
Urchins	57,698,309	32.72	3,138,784	11.81	4,828,177	21.62	2	2
Shrimp & Prawn	11,181,362	6.34	1,792,445	6.74	1,996,664	8.94	3	3
Spiny Lobster	9,855,908	5.59	538,802	2.03	1,227,303	5.50	4	4
Rockfishes	8,033,493	4.56	537,850	2.02	886,279	3.97	5	5
<b>sub-total (TOP 5)</b>	<b>146,615,853</b>	<b>83.14</b>	<b>23,242,997</b>	<b>87.44</b>	<b>18,720,718</b>	<b>83.82</b>		
Crab	7,903,266	4.48	525,639	1.98	791,657	3.54	7	7
Flatfish	5,530,196	3.14	1,109,860	4.18	809,709	3.63	4	6
Abalone	2,805,580	1.59	19	0.00	195,709	0.88	n/a	12
Tuna	2,379,268	1.35	382,396	1.44	440,161	1.97	8	8
Other	2,200,582	1.25	131,247	0.49	301,839	1.35	n/a	9
<b>sub-total (6-10)</b>	<b>20,818,892</b>	<b>11.81</b>	<b>2,149,161</b>	<b>8.09</b>	<b>2,539,075</b>	<b>11.37</b>		
<b>Total TOP 10</b>	<b>167,434,745</b>	<b>94.95</b>	<b>25,392,158</b>	<b>95.53</b>	<b>21,259,793</b>	<b>95.19</b>		
<b>Total TOP 8, excluding Abalone &amp; Other</b>	<b>162,428,583</b>	<b>92.11</b>	<b>25,260,892</b>	<b>95.03</b>	<b>20,762,245</b>	<b>92.96</b>		
<b>Total All Species</b>	<b>176,337,909</b>	<b>100.00</b>	<b>26,581,376</b>	<b>100.00</b>	<b>22,333,986</b>	<b>100.00</b>		
Sea Cucumbers	1,237,263	0.70	324,978	1.22	228,384	1.02	10	11
Swordfish	1,298,686	0.74	175,093	0.66	102,149	0.46	11	n/a
Anchovy & Sardines	1,957,269	1.11	348,292	1.31	301,839	1.35	9	10